ABEL USER'S MANUAL

Prepared for:

Program Development and Training Branch (LE-133)
Office of Enforcement Policy
Office of Enforcement
United States Environmental Protection Agency
401 M Street, S.W.
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(FTS-260-6777)

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THIS MANUAL IS RELEASABLE IN ITS ENTIRETY

ABEL USER'S MANUAL

COMMENT FORM

The Office of Enforcement is very interested in your comments on this ABEL User's Manual. After you have had a chance to use the manual a few times, please fill out this comment form and return it to:

Jonathan Libber, LE-133
U.S. E.P.A.
401 M Street, S.W.
Washington, D.C. 20460

If there are any significant errors in the manual, or it needs to be updated in some fashion, we will mail out revised pages to the names on our mailing list. Thus, it is important that you add your name to that list, if it is not already on it.

I. INTRODUCTION

	Excellent	Satisfactory	Poor	No Opinion
A. Clarity				
B. Usefulness				

C. Additional Comments:

_____

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II. USING THE COMPUTER PROGRAM

	Excellent	Satisfactory	Poor	No Opinion
A. Clarity				
B. Usefulness				

C. Additional Comments:

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III. DATA REQUIREMENTS

	Excellent	Satisfactory	Poor	No Opinion
A. Clarity				
B. Usefulness				

C. Additional Comments:

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	Excellent	Satisfactory	Poor	No Opinion
A. Clarity				
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C. Additional Comments:

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V. SAMPLE SESSION

	Excellent	Satisfactory	Poor	No Opinion
A. Clarity				
B. Usefulness				

C. Additional Comments:

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VI. APPENDICES

	Excellent	Satisfactory	Poor	No Opinion
A. Clarity				
B. Usefulness				

C. Additional Comments:

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A. OVERVIEW

This manual provides step-by-step instructions for using the ABEL model. The model is a computer program designed to assist EPA in assessing a firm's ability to finance one or more of the following items:

- o a civil penalty;
- o new investments in pollution control equipment; and
- o environmental clean-up costs.

For the purposes of this manual, these items are collectively referred to as "environmental expenditures."

ABEL is designed to evaluate the financial health of corporations. The model uses a consistent set of financial data, namely the corporation's federal tax returns, to make this evaluation. Besides providing a consistent set of information, tax return data also allow for the analysis of private corporations, which are typically more difficult to analyze because financial data on these firms are generally not publicly available. An understanding of economic or financial theory is not necessary when using ABEL. This manual provides all the information needed to run the program and interpret the results.[1]

[1] For information on how to obtain access to the ABEL program, see the ABEL User's Guide.

The ABEL model is part of an ongoing EPA effort to evaluate the financial health of firms involved in enforcement proceedings.[2] ABEL may often serve as an adjunct to other computer programs used for enforcement purposes, such as BEN or the Superfund Financial Assessment System (SFAS). BEN is used to calculate the economic benefits a violator derives from delaying or avoiding compliance with environmental statutes. SFAS utilizes publicly available information to assess a firm's ability to fund remediation costs at Superfund sites. ABEL, while similar to SFAS, treats certain issues in a more sophisticated manner and offers the user greater flexibility in the types of analyses that can be performed. Therefore, in certain instances, ABEL may be more appropriate than SFAS in determining a firm's ability to fund remediation costs. As with any of these models, however, the results provided by ABEL must be interpreted in a manner consistent with the assumptions used within the model. The purpose of this manual is not only to help you operate the program, but also to help you understand the assumptions used within the program.

ABEL is a sophisticated screening tool that is designed to assist enforcement personnel in evaluating violators' claims of inability to pay. It is designed to be used principally in negotiations. The ABEL model is generally not intended for use at a trial or in an administrative hearing. If the Agency is going to present ability to pay testimony in these settings, the Agency will usually rely on an expert to provide an independent financial analysis. This independent financial analysis, while consistent with the principles of the ABEL model, may not necessarily be identical to the method used by ABEL.[3]

Two issues regarding the model should be kept in mind when assessing a firm's ability to pay: (1) ABEL tends to be conservative in predicting ability to pay; and (2) the most important part of the ABEL analysis, Phase II, focuses only on a firm's cash flow. Consequently, if ABEL determines that a firm can afford to pay, Agency personnel do not need to look any further at the issue unless it goes to trial or hearing.[4] If the model yields an

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[2] For purposes of this manual, any person, partnership, corporation, or other for-profit entity that is a defendant in an EPA administrative or judicial enforcement action is referred to simply as a "firm."

[3] For assistance with the selection of an expert on ability to pay and financial analysis, EPA staff should call Jonathan Libber, the BEN/ABEL coordinator, at FTS/202 260-6777.

[4] If the ability to pay issue is going to be raised at a trial or hearing, the Agency should be prepared to explain where the funds to pay for compliance, clean-up or penalties are going to come from. In order to do that, you may need to use an expert. Agency personnel are strongly advised against using the ABEL model in a trial or hearing, as it is biased in favor of the violator (it only handles the cash flow part of the analysis) and it is unlikely that a trier of fact will fully comprehend the complex analysis that ABEL performs. In a trial or hearing, it is usually far more effective to explicitly identify potential sources of funds.

indeterminate answer or determines an inability to pay, however, the user should conduct additional financial analyses before reducing a civil penalty, as even firms with poor cash flow often have sufficient resources to pay for environmental expenditures. These analyses may involve reviewing additional financial information on the firm, or analyzing sections of the firm's tax forms not utilized in the ABEL model.

One crucial, but often overlooked, policy matter is that the Agency will not automatically reduce a penalty even when a violator proves conclusively that it cannot afford to pay. The Agency will not reduce the civil penalty for inability to pay in following situations:

- the violator refuses to comply with pollution control requirements;
- the violator cannot afford to comply with pollution control requirements; or
- the violator's conduct was egregious (e.g. willful violations, or violations that might have or actually endangered lives).[5]

B. PURPOSE OF THE PROGRAM

ABEL is used as part of EPA's penalty development process, where Agency staff need an assessment of a firm's ability to pay for environmental expenditures or a penalty. ABEL is frequently used with EPA's BEN computer model. BEN calculates the economic benefit a for-profit or not-for-profit firm receives from delaying or avoiding compliance with EPA regulations. This economic benefit is one of the factors the Agency considers in assessing penalties for violators.

It is important to remember that ABEL has been designed to evaluate a firm's claim regarding its ability to pay after the initial penalty has been proposed. The burden of proof remains on the violator to support its claim of inability to pay. Given the violator's incentives to avoid large penalties and investments, many firms will initially claim inability to pay regardless of their financial health.

C. DEFINING "ABILITY TO PAY"

The type of analysis ABEL performs is often generically referred to as an "ability to pay" analysis

[5] For more guidance see "Guidance on Determining a Violator's Ability to Pay a Civil Penalty", December 16, 1986, codified as GM-56 in the General Enforcement Policy Compendium.

because the program is analyzing a firm's ability to pay a penalty or an environmental expenditure. When interpreting the results of the ABEL analysis, it is important to understand what is meant by ability to pay, as there is no strict definition in an economic or financial sense. A firm's ability to finance environmental penalties or expenditures depends on the level of financial distress one is willing to impose on the firm. For instance, a very simple measure of a firm's ability to pay might be how much cash or liquid assets (such as certificates of deposit) the firm has immediately available. Other more stringent measures might require the firm to rely on its future earnings to finance an environmental expenditure. Examples of future earnings that could be used to fund these expenditures include internally generated cash flows, loans on unlevered assets, the sale of assets, and the sale of stock.[6] Finally, for cases involving non-incorporated businesses, the Agency or a court may look at the personal assets of the owners in determining their ability to meet a penalty assessment.[7]

After analyzing some basic financial ratios that reflect firm solvency, ABEL assesses a firm's ability to pay by focusing on projected cash flows. The model explicitly calculates the value of projected, internally generated cash flows from historical tax information, and compares these cash flows to the proposed environmental expenditure(s). This measure of ability to pay is more stringent than measures of cash or liquid assets on hand, but less stringent than the legal liability of the firm's owners.

D. HOW TO USE THE MANUAL

This manual provides step-by-step instructions for using the ABEL model. Chapter 2 describes how to operate the ABEL computer program. This chapter explains how the program is structured and how to enter data. Chapter 3 provides detailed information about all aspects of the program's data requirements. Chapter 4 explains how to interpret ABEL's output. This chapter also includes numerous illustrations of the output program. Chapter 5 details ABEL's printing, saving and retrieving options. Chapter 6 provides a sample ABEL session, including all user inputs, computer prompts, and program output. All chapters provide examples directly from the program. These examples have been put in shaded boxes to distinguish them from the text of the manual.

There are also three appendices to this manual. Appendix A contains the ABEL Data Entry Forms. Appendix B provides the financial equations used by ABEL to generate its results and Appendix C provides

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[6] Internally generated cash flow reflects the income that a firm has generated from ongoing operations, less all cash expenses, including taxes.

[7] For incorporated firms, liability is limited to the value of shareholder's equity.

guidance on using tax forms other than Form 1120 or 1120-A.

Before using the program for the first time, you should thoroughly read all six chapters of this manual. It is not necessary, however, that you read or understand Appendices A, B, or C. Appendix C should be read before analyzing firms that do not file corporate tax return Forms 1120 or 1120-A. This appendix contains guidance on performing ABEL analyses of firms that file Form 1065, Form 1120-S and the Sole Proprietorship form.

If you need assistance in operating the program, understanding the results, or other guidance in effectively using ABEL, contact the Program Development and Training Branch at 202-260-6777 or FTS-260-6777.

ABEL is an interactive computer program designed to operate in a time-sharing mode or on a personal computer (PC). This chapter provides a detailed description of the basic requirements for entering data and running the ABEL program. This chapter should be used in conjunction with Chapter 3, which describes ABEL's data requirements.

Chapter 2 is divided into two sections. Section A briefly describes how the computer program is structured and provides an overview of the choices that ABEL presents during program execution. Section B provides data format requirements and directions for entering data into the ABEL model. Section B also illustrates the error messages ABEL provides if data are entered improperly.

A. STRUCTURE OF THE PROGRAM

ABEL requests information on the firm's historical financial condition, and, based on this information, evaluates the firm's ability to pay environmental expenditures. In Phase I of ABEL, the program uses one to five years of federal income tax data to calculate five ratios that indicate the financial health of the organization. Based on these ratios, ABEL develops a general assessment of the firm's current financial condition.

If at least three years of the firm's tax data are available, ABEL can also perform a Phase II analysis. In Phase II, ABEL assesses whether the firm will be able to pay for the environmental expenditure that you

propose. After you provide ABEL with information on proposed environmental expenditures, the model estimates the probability that the firm can pay for these costs out of internally generated cash flows. Phase II also gives you the option of reviewing more in-depth information, such as a breakdown of the firm's historic cash flows.

After you have completed Phase II, ABEL will ask you to select an output format for the results of your analysis. Next, ABEL will give you the choice of modifying your Phase I inputs, evaluating another firm, or concluding the session. If you choose to evaluate a different firm, ABEL will give you the opportunity to save all of your Phase I and Phase II input values to a computer file, before resetting all values and returning to the beginning of the program. If you choose to conclude the ABEL session, the program will allow you to save the most recent input values to a computer file before quitting the program.

B. ENTERING THE DATA

1. Logging On and Starting the Program

Once you have obtained the firm's tax forms, you are ready to run the ABEL program. As indicated earlier, ABEL can be run from EPA's mainframe computer located in Research Triangle Park (RTP), North Carolina. If you have obtained the PC version of the program, the model can be run from a personal computer. The ABEL User's Guide contains information on how to log on to EPA's mainframe and use ABEL. The User's Guide also describes how to start up the PC version of the program.

To illustrate the prompts you receive from the computer and your inputs in response to these prompts, examples are presented below in shaded boxes. All text generated by the computer is shown in regular typeface, while all user responses are shown in bold typeface. When entering your responses, you must press the carriage return key ("ENTER" key) to alert the computer that you have completed a data entry and that you are ready for the next prompt.

2. General Information

ABEL is an interactive computer program. The terminal prints or displays a question and then waits for you to type an answer. The cursor (or print head) returns to the beginning of the next line after printing each prompt.[8] Be aware that if you are using ABEL on the EPA mainframe (as opposed to the PC version of the program) there might be slight hesitations in the computer's response because of the time-sharing mode. Messages sent to and from the computer compete for time with messages to and from other time-sharing users. Many long hesitations indicate increased use of the mainframe.[9]

ABEL is different from most PC software programs (such as spreadsheets) in that its user interaction is linear, as opposed to page-oriented. This means that you cannot "back-up," or edit an entry which you have already made. Instead, you must enter a **B** for "Back" to return to the previous question. If you need to go back several steps, you should enter **B** followed by a carriage return, the appropriate number of times. In the illustration below, the user went back two lines to data item 5, where the user changed the entry from 500 to 5000.

[8] If you are using a TTY, you should wait until the entire prompt is printed and the print head has returned to the next line before entering data.

[9] Another type of delay can occur if you have not used the program in the previous two weeks. In this case, the mainframe will need to pull information from archives, and you will be put "on hold" until this procedure is completed. The computer will let you know that this is occurring by giving you a prompt preceded by "ARC."

```
7. Please enter Special Deductions
(in Thousands)
B

6. Please enter Net Operating Loss Deductions
(in Thousands)
  (Current Value =      22.00, press ENTER to retain it)
B


5. Please enter Taxable Income Before Net Operating Loss
(in Thousands)
  (Current Value =      500.00, press ENTER to retain it)
5000
```

Other useful features in the data entry portion of ABEL are the V (for "View"), H (for "Help"), S (for "Save"), and Q (for "Quit") keys. During Phase I, typing a **V** followed by a carriage return will produce a menu which allows you to choose the year of tax data you wish to view. ABEL then allows you to examine the data you have entered, as shown below.

```
8. Please enter Total Tax
(in Thousands)
V

You have entered data for 1989, 1988.
Which year of data would you like to view?
    Select:
                1. 1989
                2. 1988

                R. Resume entering data
```

Typing an **H** followed by a carriage return will provide a brief explanation of the information required. Specifically, you may be told why the input is requested, where to obtain it, or who to call if you have any questions. After the "Help" explanation has been printed on the computer screen, ABEL will prompt you again for the requested information. An example of a "Help" statement is illustrated below.

```
You have entered Phase I data for 1989, 1988, 1987.
Which year of data would you like to review?
    Select:
                1. 1989
                2. 1988
                3. 1987

                G. Go on to Phase I results
H
================================================

Help:

     At this time, ABEL allows you to review any of your data
  inputs before proceeding with the Phase I analysis.  To review the
  data inputs for a particular year, type the appropriate number that
  corresponds to that year.  If you would like to proceed directly to
  the Phase I results, type "G" to do so.
================================================

Press carriage return (or ENTER) to continue.
```

Typing an **S** followed by a carriage return allows you to save your Phase I inputs at any time during the data entry process. If for some reason you cannot complete an ABEL analysis in one session, this option allows you to save your inputs even if you have not finished entering the tax data. At a later time, you may retrieve this file and resume entering data. Your data files will remain in your user account for 14 days. File saving procedures are discussed in greater detail in Chapter 5.

Typing a **Q** followed by a carriage return allows you to leave the ABEL program at any time. If you decide to quit, ABEL will ask if you want to save your inputs before you leave the program. As a safety feature, ABEL always asks you to confirm that you want to leave the program.

12. Please enter Trade Notes & Accounts Receivable Less Bad Debts
(in Thousands)
Q

*** YOU ARE ABOUT TO EXIT ABEL ***

Do you want to save your inputs first (Y = yes, N = no)?
N

Are you sure you want to quit (Y = yes, N = no)?
Y

3. Entering Data for the ABEL Analysis

After the introduction, ABEL provides the following message, which lets you choose how to enter your data:

How will you enter data for the ABEL analysis?

1. Enter data during ABEL session.
2. Use a previously saved file.

Enter your selection (1 or 2):
1

If you are entering a firm's data for the first time, you should type **1**. If you have already entered and saved a firm's data and would like to retrieve these data, type **2**. Chapter 5 describes in detail how to create and retrieve an input file.

4. Format of the Data Entries

ABEL data entries require specific formats. All numerical values must be entered without commas, dollar signs, or percent signs. For example, a $10,000 interest expense should be entered as **10000**. In addition, many of the Phase II data entries require both a dollar amount and the year in which the dollars are expressed.[10] For example, if you are entering a one-time pollution control expense of $225,000 based on 1989 dollars, your ABEL entry should be **225000 1989**.

Throughout this manual and in the ABEL program itself, we refer to the year of the dollars in which an expenditure is expressed as the "year-dollars."[11] In the above example, the costs are stated in 1989 year-dollars. The year-dollars must contain four digits.

Some data entries represent percentages. You should enter these as a number without a percent symbol (e.g., enter **20.4** to represent 20.4%). If you are entering a number with a fractional value, such as 1/3, you need to translate the fraction to decimal value (e.g., enter **0.33** to represent 1/3).

Be careful to use only number keys to enter numerical values. A common mistake is typing the lowercase letter **L** instead of the number **1**. Another error occurs when the letter **O** is typed instead of the number **0** (zero).

ABEL requires a specific format for each data entry. If you do not follow the exact format, ABEL prints an explanatory error message and then reprompts you for the correct entry. After you correctly type the entry, press the carriage return (or "ENTER" key) to transmit the data and signal to the computer that you are ready for the next prompt.

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[10] These data entries are identical to the format used in the BEN Model for pollution control capital costs, one-time expenditures, and annual costs.

[11] In calculating cash flows, ABEL converts certain Phase II dollar inputs (pollution control expenditures and annual costs) into dollars of the year in which the firm will be investing in pollution control equipment and/or paying a penalty. This dollar-year conversion is necessary to make the costs comparable on an inflation-adjusted basis.

ABEL allows you to round data inputs to thousands or millions of dollars if you wish to do so. In order to produce a reliable ABEL analysis, you must enter all of the data in consistent units of measure. Thus, all costs and tax data must be entered in dollars, thousands of dollars, or millions of dollars. If, for example, the firm has sales of several million dollars, you may choose to make all entries in units of millions of dollars to minimize the number of digits that you need to enter for each input value. If this is the case, you should indicate that you are using units of millions of dollars, and input the tax return, pollution control expenditure, and penalty values after they have been divided by 1,000,000. Note that ABEL requires that all numerical values be eight digits or less in length.

5. Correcting Typing Errors

After typing your entry you may discover that you have typed an incorrect letter or number. If you have not yet pressed the carriage return (or "ENTER" key), correcting the mistake is straightforward. Simply press the "BACKSPACE" key for each character that you wish to delete, and type in the correct information. For example, if you had typed **10,234** and wanted to delete the comma, you would press the "BACKSPACE" key four times, type **234**, press the "SPACE BAR" once to delete the extra **4**, and then press the carriage return (or "ENTER" key). If you are using a PC, the cursor will erase each figure as you press the backspace key, and your corrected entry will appear on the screen.[12] Since you corrected the mistake before hitting the carriage return (or "ENTER" key), the terminal sends 10234 to the computer, instead of the 10,234 entry that you originally typed.

If you discover the error after you have pressed the carriage return (or "ENTER" key), the terminal will send the incorrect entry to the computer. If your entry contains an unacceptable character, ABEL will print an error message and reprompt you for a corrected input. ABEL will not detect an error if you simply enter an incorrect value. For instance, if you type **10244** instead of the intended value of **10234**, your calculation will be based on an erroneous input. You can correct the error immediately by typing **B**, which will direct ABEL to repeat the previous data prompt and show you the current value for that item. Alternatively, you can type **V** at any time which will allow you to view your data inputs and correct any error you may have made.

[12] If you are using a TTY, the print head will move one space backwards each time you press the backspace key. Since the original entry is already typed on paper, the backward movement will not erase figures that are being deleted. Rather, your corrected entry will be typed on top of the original entry.

6. Error Messages

Occasionally, you might forget to follow the format rules when typing data entries, or you might select an option number that does not exist. In such instances, ABEL will alert you to the mistake. After displaying a message identifying the error, ABEL will prompt you to re-enter the data in the correct format.

There are three general types of mistakes that generate error messages: out-of-range input values, format errors, and illegal characters. Each of these error messages is described below. Examples from ABEL sessions illustrate each error and the related correction; user entries are shown in bold-face print.

a. Unavailable or Out-of-Range

If you choose an option that was either not presented or not in the allowable range, ABEL will print an error message. For example, when ABEL asks you if you would like an introduction, you must respond with a yes (**Y**) or no (**N**) answer. In the following example, the user mistakenly typed **1** to indicate the first choice instead of typing **Y** to signify yes.

```
        Welcome to ABEL.  ABEL evaluates a firm's ability to pay pollution
        control expenditures, environmental cleanup costs, and/or a civil
        penalty.  This version of ABEL was introduced in 1991.


Would you like an introduction (Y=yes, N=no)?
1

ERROR: THE ABOVE ENTRY IS NOT AN AVAILABLE OPTION.  PLEASE ENTER AGAIN.

        Welcome to ABEL.  ABEL evaluates a firm's ability to pay pollution
        control expenditures, environmental cleanup costs, and/or a civil
        penalty.  This version of ABEL was introduced in 1991.


Would you like an introduction (Y=yes, N=no)?
Y
```

ABEL recognizes the error, prints an error message, and reprompts the user for the correct information

with the same question. The user then correctly typed **Y**, which is one of the available response options. This error message will appear whenever you type anything other than **Y** or **N** to the above question.

The next example involves a response which is out-of-range. The user asks to change Variable 30, when in fact there are only Variables 1 through 26. As illustrated in this example, ABEL prints an error message indicating that the entry is an illegal value.

```
The following 1989 data have been entered (in Thousands):

19. Other Current Liabilities                                    1300.00
20. Loans from Stockholders                                       700.00
21. Mortgages, Bonds Payable in One Year or More                  900.00
22. Other Liabilities                                             350.00
23. Appropriated Retained Earnings                                  .00
24. Unappropriated Retained Earnings                             1500.00
25. Total Liability and Stockholders' Equity                     7600.00
26. Income Recorded on Books not Included in Return                 .00

Enter the number of the value you wish to change (e.g. enter 19 to change  Other Current Liabilities
    ).
Enter G(o) to return to year-selecting screen.
Enter B(ack) to display previous screen.
30

ERROR: THE ABOVE ENTRY IS AN ILLEGAL VALUE. PLEASE ENTER AGAIN.
```

Another instance where an entry can be out-of-range is when a negative value is entered for a value that can only be positive. For example, the "Accounts Payable" data item will always be a positive number. If a negative value is entered, ABEL prints the following error message:

```
17. Please enter Accounts Payable
(in Thousands)
-500

ERROR: THIS INPUT CANNOT BE A NEGATIVE NUMBER. PLEASE CHECK
YOUR TAX DATA AND ENTER AGAIN.

17. Please enter Accounts Payable
(in Thousands)
  (Current Value =     -500.00, press ENTER to retain it)
1750
```

b. Format Error

The second type of general error message involves the format of the data item. If you enter the data in an unacceptable format, ABEL will issue an error message. In the example below, the user incorrectly typed a comma when entering a dollar amount.

```
17. Please enter Accounts Payable
(in Thousands)
1,750

ERROR: AN ILLEGAL CHARACTER EXISTS IN THE ABOVE ENTRY. PLEASE ENTER AGAIN.

17. Please enter Accounts Payable
(in Thousands)
  (Current Value =        .00, press ENTER to retain it)
```

c. Illegal Character

The final type of general error message occurs if you enter an illegal character. Most commonly, the user types a character that does not belong to the same alphanumeric category as the rest of the entry. For example, typing **$10000** as a cost entry generates an error message because a dollar sign is not a number. Similarly, typing **20%** to enter "20 percent" is not acceptable because **20%** contains the nonnumeric percent sign. One very common mistake, illustrated below, is to type the lowercase letter **L** instead of the number **1** when entering numeric values.

```
17. Please enter Accounts Payable
(in Thousands)
l750

ERROR: AN ILLEGAL CHARACTER EXISTS IN THE ABOVE ENTRY.  PLEASE ENTER AGAIN.

17. Please enter Accounts Payable
(in Thousands)
  (Current Value =        .00, press ENTER to retain it)
```

Another common mistake is typing the letter **O** instead of the number **0** (zero) when entering numeric values. As in the above example, ABEL issues an illegal character error message before reprompting for the correct information.

```
17. Please enter Accounts Payable
(in Thousands)
175O

ERROR: AN ILLEGAL CHARACTER EXISTS IN THE ABOVE ENTRY.  PLEASE ENTER AGAIN.

17. Please enter Accounts Payable
(in Thousands)
  (Current Value =        .00, press ENTER to retain it)
```

ABEL's analysis is based on data from the firm's past federal income tax returns. You should ask the violator to produce three to five years of its most recent tax returns. ABEL is designed to accept data directly from Forms 1120 and 1120A, or indirectly through the ABEL Data Entry Form. ABEL also accepts information from three additional tax forms. Appendix C contains guidance on using ABEL with Form 1120-S, Form 1065 and the Sole Proprietorship Form.

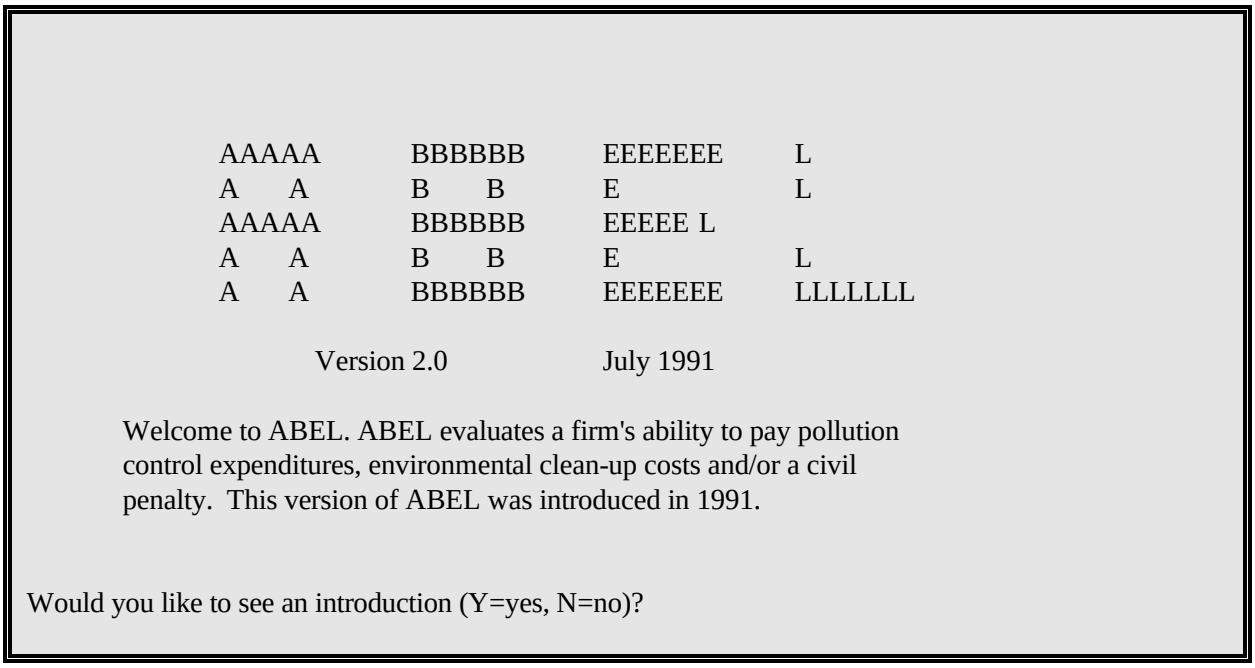
The firm's most recent tax data are required for ABEL to produce a reliable analysis. If the firm re-filed any 1120 or 1120-A forms for the years that you are using, it is essential that you obtain the most up-to-date version of these forms. In addition, all returns submitted for an ABEL analysis must be signed. One of the key advantages of using tax returns is that the violator has stated, under the penalty of perjury, that the information provided on the tax form is true. Without the signature, you have no guarantee that this information is accurate. If the violator no longer has signed copies, the violator can obtain these from the IRS.

In order to evaluate a firm's financial condition using ABEL, you must understand its relationship to other business entities. For instance, a violator may be the subsidiary of a large parent corporation, or may be one of several closely related "sister" firms. While the violator may be filing its own tax returns, it is easy for another entity to make the violator look artificially poor by manipulating the violator's finances. In these situations, Agency personnel should insist on seeing tax returns and other relevant financial reports from all related firms. This subject is discussed in more detail in the ABEL User's Guide.

A. REQUIRED FINANCIAL DATA -- PHASE I

1. Introduction

Immediately after you enter the ABEL program, you will be provided with a brief message:



If you are using ABEL for the first time, you may want a detailed introduction to the model. This introduction explains what ABEL does, describes how it will prompt you for information, and lists formatting requirements for data entry. If you would like to read this introduction type **Y**, otherwise type **N**.

2. Background Information

Immediately after the introduction, ABEL asks for background information about the case that is being evaluated.

a. Name of Firm

ABEL asks for the name of the firm you are analyzing. You may enter the firm's name or another descriptive phrase that will identify the analysis. The firm's name can consist of several words separated by spaces (e.g., ABC Corporation). However, there is a twenty character limit on this entry. The firm name will be printed on your ABEL output.

ABEL will now ask you for some background information on your case:

1A. Please enter the name of the firm to be analyzed (e.g., ABC Corp.)
XYZ Corporation

b. Statute

As illustrated below, ABEL asks you to identify the statute under which you are citing the violator. If the violator is affected by more than one statute, you should select the most important one. ABEL allows you to choose from 11 specific statutes, as well as an "other" option for statutes that are not listed. This entry is for record-keeping purposes only. The selection of a statute does not affect the ability to pay calculation.

1B. Please identify the statute involved in your case. If your case involves more than one statute, please pick the most important one.

1. Clean Air Act - Stationary source
2. Clean Air Act - Mobile source
3. Clean Water Act - 404
4. Clean Water Act - NPDES
5. FIFRA
6. UST (Underground Storage Tank)
7. RCRA (Other than UST)
8. Safe Drinking Water Act - UIC
9. Safe Drinking Water Act - PWS
10. Superfund
11. TSCA
12. Other

Enter the number of the statute you have selected:
10

c. Analysis Date

Enter the current date in any format. ABEL accepts **2/23/91** just as easily as **February 23, 1991** or **Feb. 23, 1991**. This date will appear on all of your printed outputs.

2. Please enter today's date (e.g., June 1, 1990):
February 23, 1991

d. Years of Data Available

ABEL asks you to specify how many years of tax return data you plan to enter. This information allows the program to set up its analysis accordingly. Phase I of ABEL will operate with one to five years of income tax return data. Phase II requires at least three years of data. Since most users will be primarily interested in Phase II, which provides an analysis of the firm's cash flows, you should always request that the firm provide a minimum of three years of data.

You must supply ABEL with tax return data for consecutive years. If the tax return data are not from consecutive years' returns, your Phase I financial ratios will be correct, but the years associated with these ratios will be mislabeled. In addition, your Phase II results will be unreliable.

3. Please Enter the Number of Years of Data Available
3

e. Most Recent Year of Data

ABEL asks you to enter the most recent year of tax return data that you have collected. For example, if you have collected a firm's tax returns for 1987, 1988, and 1989, you should enter 1989 as the most recent year.

4. Please Enter the Most Recent Year
1989

f. Data Units

You must tell ABEL the units in which you are going to enter the data: dollars, thousands of dollars, or millions of dollars. For example, if you want to enter the firm's tax data in thousands of dollars, enter **2** as shown below. This means that you must round off your data inputs to the thousands place. In other words, if one of the firm's data items was $10,346, you would enter **10** into the ABEL program.

```
Please enter units that you are going to enter your data in:

   1. Dollars.
   2. Thousands of dollars.
   3. Millions of dollars.

**********************************************************************
   For example, if you choose "2", Thousands of dollars, you
   must enter all data inputs in thousands of dollars (e.g.
   $10,000 must be entered as "10".)
**********************************************************************
2
```

3. Income Tax Return Data

ABEL can handle up to 26 separate inputs from the most recent year's tax return and 25 inputs from all other years' tax returns.[13] In addition to accepting inputs from the standard "U.S. Corporation Income Tax Return Form 1120," ABEL also accepts inputs from Form 1120-A.[14] Form 1120-A is very similar to Form 1120, but is designed for small corporations.[15]

Exhibit 3-1 shows a sample of the 1989 Form 1120 tax return. Each required data item is marked with a number indicating its ABEL data entry item. Exhibit 3-2 lists the required inputs in order, summarizing their locations on both Form 1120 and 1120-A tax returns. Exhibits 3-1 and 3-2 are provided for informational purposes only. When running the ABEL program, you do not have to refer to these exhibits as the program provides you with the required tax form line numbers.

[13] The most recent year requires one additional tax return input to estimate when the outstanding net operating loss that is carried forward, if any, will be used up. In Exhibit 3-2, this input is data item #6, "NOL Deductions."

[14] See Appendix C for instructions on using other tax forms with ABEL.

[15] In 1989, one criterion a firm had to meet to file Form 1120-A was that its gross sales, total income, and total assets each be under $500,000.

Exhibit 3-1

LOCATION OF FINANCIAL DATA ON 1989 FORM 1120

Exhibit 3-1

LOCATION OF FINANCIAL DATA ON 1989 FORM 1120
(continued)

Exhibit 3-2

NEW ABEL TAX DATA INPUTS: FORM 1120 AND 1120-A

	Data Item	Location on Form 1120*	Location on Form 1120-A*
1.	Gross Receipts or Sales Less Returns and Allowances	1c	1c
2.	Interest Expense	18	18
3.	Depreciation	20	20
4.	Depletion	22	NA., use 0
5.	Taxable Income Before NOL and Special Deductions	28	24
6.	NOL Deductions	29a	25a
7.	Special Deductions	29b	25b
8.	Total Tax	31	27
9.	Credit From Regulated Investment Companies	1988-89: 32f 1984-87: 32e	1988-89: 28f 1984-87: 28e
10.	Credit For Federal Tax on Fuels	1988-89: 32g 1984-87: 32f	1988-89: 28g 1984-87: 28f
11.	Cash	L-1, Col.(d)	II-1, Col.(b)
12.	Trade Notes and Accounts Rec. Less Allowance for Bad Debts	1989: L-2b, Col.(d) 1984-88: L-2a, Col.(d)	1989: II:2a-2b, Col.(b) 1984-88: II:2-2a, Col.(b)
13.	Inventories	L-3, Col.(d)	II-3, Col.(b)
14.	U.S. Government Obligations	L-4, Col.(d)	II-4, Col.(b)
15.	Tax-Exempt Securities	1989: L-5, Col.(d) 1984-88: NA., use 0	1989: II-5, Col.(b) 1984-88: NA., use 0
16.	Other Current Assets	1989: L-6, Col.(d) 1984-88: L-5, Col.(d)	1989: II-6, Col.(b) 1984-88: II-5, Col.(b)
17.	Accounts Payable	1989: L-16, Col.(d) 1984-88: L-15, Col.(d)	1989: II-13, Col.(b) 1984-88: II-12, Col.(b)
18.	Mortgages, Notes, Bonds Payable in Less Than One Year	1989: L-17, Col.(d) 1984-88: L-16, Col.(d)	NA., use 0

	Data Item	Location on Form 1120*	Location on Form 1120-A*
19.	Other Current Liabilities	1989: L-18, Col.(d) 1984-88: L-17, Col.(d)	1989: II-14, Col.(b) 1984-88: II-13, Col.(b)
20.	Loans From Stockholders	1989: L-19, Col.(d) 1984-88: L-18, Col.(d)	1989: II-15, Col.(b) 1984-88: II-14, Col.(b)
21.	Mortgages, Notes, Bonds Payable in One Year or More	1989: L-20, Col.(d) 1984-88: L-19, Col.(d)	1989: II-16, Col.(b) 1984-88: II-15, Col.(b)
22.	Other Liabilities	1989: L-21, Col.(d) 1984-88: L-20, Col.(d)	1989: II-17, Col.(b) 1984-88: II-16, Col.(b)
23.	Appropriated Retained Earnings	1989: L-24, Col.(d) 1984-88: L-23, Col.(d)	NA., use 0
24.	Unappropriated Retained Earnings	1989: L-25, Col.(d) 1984-88: L-24, Col.(d)	1989: II-20, Col.(b) 1984-88: II-19, Col.(b)
25.	Total Liability and Stockholder's Equity	1989: L-27, Col.(d) 1984-88: L-26, Col.(d)	1989: II-22, Col.(b) 1984-88: II-21, Col.(b)
26.	Income Recorded on Books not Included in Return	M-1:7	III-5

---

* Locations all refer to the 1984-1989 Tax Forms unless indicated otherwise. The locations are interpreted as follows, using four examples:

1. "18" indicates line 18.

2. "L-1, Col.(d)," indicates line 1 of Schedule L, column (d). All numbers from Schedule L should be taken from column (d).

3. "II-1, Col.(b)," indicates line 1 of Part II, column (b).

4. "1988-89: 32f" and "1984-87: 32e" indicates line 32f for years 1988 and 1989's tax returns and line 32e for years' 1984 through 1987's tax returns.

To simplify the data entry process, it is suggested that novice users utilize the Data Entry Forms contained in Appendix A. These forms organize all needed information in the order of ABEL's requests. Specifically, the Data Entry Forms:

- o Organize the required input data by year;
- o Expedite Phase I data entry; and
- o Simplify consistency checks between all Phase I and Phase II units of measure (dollars, thousands of dollars, or millions of dollars).

To facilitate future ABEL analyses, we suggest that you photocopy the Data Entry Forms so that you will have a sufficient supply when the need arises. Exhibit 3-3 displays the Data Entry Form that you should use with the 1989 Form 1120. All of the Data Entry Forms are contained in Appendix A. Note that the Data Entry Forms vary for different years, reflecting differences in the tax forms from year to year.

Prior to entering each year of data, ABEL will ask how you plan to enter your data. You have the choice of using the appropriate Data Entry Form or entering the data directly from Form 1120 or Form 1120-A.[16]

```
Which form are you using for year 1989?
1) ABEL Data Entry Form  2) Form 1120  3) Form 1120A
2
```

You can use different forms in the same ABEL session. For example, a firm may have filed Form 1120-A in 1987 and 1988 but filed Form 1120 in 1989.

[16] Certain items contained on Form 1120 are not applicable when using Form 1120-A. For example, depletion is not included on Form 1120-A. ABEL is constructed so that it does not ask you to input values for items that are not applicable.

Exhibit 3-3

ABEL DATA ENTRY FORM: 1989 AND 1990 FORM 1120

Fill in data year:

DATA ENTRY FORM FOR 1989 AND 1990 TAX FORM 1120	
1. Gross Receipts or Sales Less Returns and Allowances (Line 1c)	
2. Interest Expense (Line 18)	
3. Depreciation (Line 20)	
4. Depletion (Line 22)	
5. Taxable Income Before NOL and Special Deductions (Line 28)	
6. NOL Deductions (Line 29a)	
7. Special Deductions (Line 29b)	
8. Total Tax (Line 31)	
9. Credit from Regulated Investment Companies (Line 32f)	
10. Credit for Federal Tax on Fuels (Line 32g)	
11. Cash (Schedule L, Line 1)	
12. Trade Notes and Accounts Receivable Less Allowance for Bad Debts (Schedule L, Line 2b)	
13. Inventories (Schedule L, Line 3)	
14. U.S. Government Obligations (Schedule L, Line 4)	
15. Tax-Exempt Securities (Schedule L, Line 5)	
16. Other Current Assets (Schedule L, Line 6)	
17. Accounts Payable (Schedule L, Line 16)	
18. Mortgages, Notes, Bonds Payable in Less Than One Year (Schedule L, Line 17)	
19. Other Current Liabilities (Schedule L, Line 18)	
20. Loans from Stockholders (Schedule L, Line 19)	
21. Mortgages, Notes, Bonds Payable in One Year or More (Schedule L, Line 20)	
22. Other Liabilities (Schedule L, Line 21)	
23. Appropriated Retained Earnings (Schedule L, Line 24)	
24. Unappropriated Retained Earnings (Schedule L, Line 25)	
25. Total Liability and Stockholders' Equity (Schedule L, Line 27)	
26. Income Recorded on Books not Included in Return (Schedule M-1, Line 7)	

Note: All Form 1120, Schedule L, entries should be taken from column (d), the right-most column.

If you decide to enter your data directly from either Form 1120 or Form 1120-A, ABEL will identify the line and location of the data on that year's form as illustrated below:

```
1. Please enter Gross Receipts or Sales Less Returns & Allowances
(in Thousands)
  From Line 1c, Form 1120:
6800
```

If you decide to use the Data Entry Forms to enter Phase I tax return data, ABEL will ask you for the input item (e.g., Interest Expense) whose number matches the line number on the Data Entry Form. In other words, the line prompts for the tax forms are not provided.

```
2. Please enter Interest Expense
(in Thousands)
100
```

4. Phase I Data Verification Checks

As you enter Phase I tax return data, ABEL conducts two checks to ensure data reliability. The first check assures that data are sensible relative to other values that have been entered, while the second check confirms that the data fall within an allowable range of values. If a data input fails a check, ABEL will explain the problem and ask you to re-enter the correct value. Once you have entered an acceptable value, ABEL will allow you to proceed to the next input value.

The Phase I data checks consist of the following:

- There must be one to five years of tax return data. If this is not the case, ABEL will print the following message:

```
3. Please Enter the Number of Years of Data Available
6

ERROR: THE NUMBER OF YEARS OF TAX RETURN DATA MUST BE A NUMBER FROM 1
TO 5.  PLEASE ENTER AGAIN.

3. Please Enter the Number of Years of Data Available
  (Current Value =   6, press ENTER to retain it)
5
```

- ABEL will not accept tax data from before 1984; only tax returns covering fiscal years 1984 or later are acceptable. If this condition does not hold, ABEL will respond:

```
4. Please Enter the Most Recent Year
1979

ERROR: ALL TAX RETURN DATA MUST BE 1984 OR LATER.  THE MODEL WILL NOT
ACCEPT ANY TAX DATA BEFORE 1984.

4. Please Enter the Most Recent Year
1989
```

- If your input is not a number or a B, V, H, S, or Q, ABEL will respond:

```
1. Please enter Gross Receipts or Sales Less Returns & Allowances
(in Thousands)
D

ERROR: AN ILLEGAL CHARACTER EXISTS IN THE ABOVE ENTRY. PLEASE ENTER AGAIN.

1. Please enter Gross Receipts or Sales Less Returns & Allowances
(in Thousands)
6800
```

- Except for (5) Taxable Income before N.O.L. deductions, (8) Total Tax, and (23) Appropriated and (24) Unappropriated Retained Earnings, your Phase I tax return inputs cannot be negative values. If you enter a negative value for an input other than the four listed above, ABEL will respond:

```
1. Please enter Gross Receipts or Sales Less Returns & Allowances
(in Thousands)
-500

ERROR: THIS INPUT CANNOT BE A NEGATIVE NUMBER.  PLEASE CHECK
YOUR TAX DATA AND ENTER AGAIN.

1. Please enter Gross Receipts or Sales Less Returns & Allowances
(in Thousands)
  (Current Value =     -500.00, press ENTER to retain)
1750
```

B. REQUIRED FINANCIAL DATA -- PHASE II

ABEL will proceed with Phase II if you have supplied three to five years of tax data. In order to perform the Phase II calculations, ABEL needs data on the timing and amount of the environmental expenditure or penalty you wish to evaluate.

1. Penalty, Pollution Control Expenditures, and Clean-Up Costs

a. Pollution Control Investment Date/Penalty Payment Date

As illustrated below, ABEL asks for the dates that environmental expenditures or penalties are to be paid. You must enter all four digits for the appropriate year. In other words, enter **1991**, not **91**.

```
* * * * * * * * * * * * * * *

        ABEL is now ready to proceed with the Phase II analysis.

        Please make sure to input all of your Phase II data in
        Thousands.

1. Enter the year in which the company will be investing in pollution
control equipment and/or paying a penalty (e.g., 1991).
1991
```

ABEL assumes that the year of the environmental expenditure is the same as the year in which the firm pays the lump-sum penalty, if both are applicable.

b. Proposed Lump-Sum Settlement Penalty

ABEL then asks you for the proposed amount of the lump-sum penalty. Make sure to enter this value in the same units as your Phase I inputs. If this figure is unavailable, or if you are simply interested in how much money the firm can generate over the next five years, enter a zero and continue with the program.

```
2. Enter the proposed lump-sum settlement penalty in Thousands.
If there is no proposed penalty, enter a zero.
100
```

c. Depreciable Capital Cost of New Investment

If the firm will be required to make an investment in pollution control equipment, the initial capital cost of that investment and the year-dollars in which it is expressed should be entered. Depreciable expenditures usually apply to tangible items that wear out over a number of years, such as a groundwater monitoring system or an air pollution control device. If compliance will occur in the future, this value may be the same value you entered in BEN.[17] The depreciable capital cost should include the purchase cost of the equipment as well as the installation costs. This value should not include non-depreciable costs associated with the new investment, such as the purchase of land.

3. Enter the depreciable capital cost of pollution control investment in Thousands followed by year-dollars separated by a blank space (e.g., 60000 1989). The cost of land should not be included in this figure. Enter zero if this cost category is not applicable.
500 1987

If the depreciable capital cost value is an estimate of the current costs of installing new equipment, the estimate is probably in this year's dollars. If an estimate was made in an earlier year, consult the source of this estimate to determine when it was made. If none of the firm's pollution control investment costs are for depreciable items, enter a zero.

[17] Past expenditures on pollution control equipment should not be entered here, only current and future expenditures because past expenditures are already reflected in the firm's tax return data.

d. Non-Depreciable, Non-Tax-Deductible One-Time Costs

Any costs associated with a new pollution control investment that are not depreciable, and cannot be deducted for tax purposes, should be entered here. One common non-depreciable cost is the purchase of land. For example, the violator may have to purchase land as a site for a treatment facility. The format of this entry is the same as the previous cost entries. Enter a zero if this cost category is not applicable.

4. Enter the non-depreciable, non-tax-deductible capital costs associated with the new investment in Thousands (e.g., the cost of land) followed by year-dollars separated by a blank space (e.g., 15000 1990). Enter a zero if this cost category is not applicable.
200 1989

e. Non-Depreciable but Tax-Deductible One-Time Costs

Costs that are not depreciable but may be deducted from taxable income should be entered here. This category includes one-time costs such as funding a site cleanup, establishing a recordkeeping system, or training employees. The format of this entry is the same as the previous cost entries. Enter a zero if this category is not applicable.

5. Enter the non-depreciable but tax-deductible capital costs associated with the new investment in Thousands (e.g., site clean-up compliance costs) followed by year-dollars separated by a blank space (e.g., 30000 1989). Enter zero if this cost category is not applicable.
700 1990

f. Annual Costs

Enter any annual, recurring costs associated with operating and maintaining the required pollution control equipment or monitoring a site. Also, include the year-dollars in which the costs are expressed. The format of this entry is the same as previous cost entries.

6. Enter the annual costs of the pollution control activity in Thousands (e.g., operating and maintenance costs) followed by year-dollars separated by a blank space (e.g., 30000 1989). Enter zero if there are no annual costs.
30 1990

The figure entered in this category should reflect the average annual incremental costs associated with operating and/or maintaining the required environmental equipment. These costs include any changes in the costs of labor, power, water, raw materials and supplies, recurring training of employees, insurance premiums and any change in annual property taxes.

The value of operating and maintenance (O&M) credits should also be considered in estimating the annual incremental costs. O&M credits may represent actual O&M cost savings such as heat recovery, product or byproduct recovery, and so forth. For example, the installation of new pollution control equipment may reduce certain costs (such as sludge disposal) that were associated with operations during the period of noncompliance. If the resulting incremental O&M cost is negative (i.e., there is a net cost savings from the new pollution control equipment), the negative figure may be used in ABEL.

The annual costs should also reflect any annual lease payments for pollution control equipment. However, the annual costs should not include annualized capital recovery, interest payments, or depreciation. If there are not any annual costs, enter a zero.

2. Reviewing Phase II Inputs

After you have entered your Phase II inputs, ABEL gives you the option of reviewing and modifying the inputs:

Would you like to review your penalty & pollution control cost inputs?
(Y=yes, N=No)
Y

You have entered the following Phase II data (in Thousands):

	Value	Year-dollars
1. Investment or penalty payment year	1991	
2. Lump-sum settlement penalty	100.	1991
3. Depreciable capital cost	500.	1987
4. Non-depreciable, non-tax-deductible capital costs	200.	1989
5. Non-depreciable, tax-deductible one time costs	700.	1990
6. Annual costs	30.	1990

Enter the number of the item whose value you want to change, or type G to Go on with Phase II analysis.
For example, to change the value for the Investment Year, type 1.
G

As illustrated in the example above, if you indicate that you would like to review the inputs, the ABEL model displays the current value for each of the six inputs. At this point, you can enter the number corresponding to the data item you would like to change or you can enter a **G** to proceed with the Phase II analysis.

3. Variables With Standard Values

ABEL gives you the opportunity to review and modify five assumptions, or "standard values," that are used in the Phase II analysis. ABEL's standard values are updated yearly to reflect changes in interest rates, tax law, and so forth, although the method for calculating the value remains the same. You should not alter standard values unless you have a complete understanding of why they do not apply to your specific case.

ABEL uses the following standard values in Phase II:

1.	Reinvestment Rate	= .0
2.	Marginal Income Tax Rate (%)	= 38.5
3.	Annual Inflation Rate (%)	= 4.4
4.	Discount Rate (%)	= 12.1
5.	Weighted Average Smoothing Constant	= .3

Do you wish to have any of these items explained? (Y=Yes, N=No)
N

Do you wish to change any of these items? (Y=Yes, N=No)
Y

a. Reinvestment Rate

The reinvestment rate determines the portion of a firm's future cash flow that is allocated for reinvestment in depreciating assets. Typically, firms reinvest a portion of their earnings to replace machinery and equipment as it wears out. However, the more a firm reinvests, the less cash it will have available for payment of environmental expenditures.

The reinvestment rate variable determines the fraction of the firm's depreciation expense that you assume the firm will reinvest. ABEL uses a standard value of 0.00 for the reinvestment rate, meaning that no funds are allocated to reinvestment. This standard value is based on the assumption that a firm required to pay environmental expenditures should not be constrained from meeting those obligations by the need to replace machinery and equipment. Because ABEL forecasts only five years into the future, the firm is not permanently prevented from replacing such assets. In addition, a five-year period of reduced investment should not jeopardize the long-run solvency of most firms.

If you wish to explore a firm's ability to finance penalties or new investments under varying reinvestment scenarios, you may select a reinvestment rate that is greater than 0.00. If you enter a value greater than 0.00 and less than 1.0, you are allowing for partial replacement of the depreciated portion of the firm's existing assets. If you enter a value of 1.0, the ABEL calculation will assume full replacement of the depreciated portion of the existing assets, taking inflation into account. A value in excess of 1.0 allows for new capital expenditures.

As illustrated below, ABEL will ask you to enter the line number of the value you would like to change. Enter **1** to change the reinvestment rate, and then enter the new value when ABEL prompts you to do so.

```
Enter the number of the item you wish to have changed
(e.g. 1 for Reinvestment Rate).
1

1.    Reinvestment Rate              =   .0
Please enter the new value.
1.5
```

b. Marginal Income Tax Rate

The marginal income tax rate is the tax rate applied to the last dollar of income earned by a firm. This rate reflects the percentage of income paid for taxes if taxable income were to increase or decrease, and includes both state and federal taxes. The average tax rate is the total tax divided by the total taxable income. It is important to use the marginal tax rate because it is the rate which applies to incremental changes in the firm's tax-deductible expenses and income. This tax rate is used to derive the firm's after-tax cash flow.

The marginal tax rate does not include sales tax, inventory tax, charter tax, or taxes on property. One time tax payments, such as sales taxes on the purchase of equipment, should be included as an investment cost. If one or more of these taxes are paid regularly, then they should be included as an annual cost.

The standard value for this variable is 38.5 percent. The value is based on the marginal federal tax rate at the highest income level (34 percent) and the average of all marginal corporate tax rates imposed by states. This variable reflects the fact that state taxes are deductible from federal income taxes.

The total corporate marginal tax rates are calculated state-by-state in Exhibit 3-4.[18] If you wish, you can replace the standard value with the value for the state in which the firm files its federal taxes. Be sure to enter the marginal income tax rate in percentage terms (e.g., enter **39.2** for 39.2 percent).

Enter the number of the item you wish to have changed
(e.g. 1 for Reinvestment Rate).
2

2. Marginal Income Tax Rate (%) = 38.5
Please enter the new value.
40.3

[18] The adjustment is made by multiplying the state rates by a factor equal to one minus the marginal federal tax rate, as shown in the following formula:

$$MTR_{TOTAL} = MTR_{FEDERAL} + [MTR_{STATE} * (1 - MTR_{FEDERAL})]$$

where: $MTR_{FEDERAL}$ = the marginal tax rate at the federal level; and

MTR_{STATE} = the marginal tax rate at the state level

Therefore, if you were to calculate the total marginal tax rate based on a marginal state tax rate of 10%, the result would be 40.6 percent. This calculation is shown below:

$$\begin{aligned} MTR_{TOTAL} &= .34 + [.10 * (1 - .34)] \\ &= .34 + (.10 * .66) \\ &= .34 + .066 \\ &= .406 \\ &= 40.6\% \end{aligned}$$

Exhibit 3-4

TOTAL CORPORATE MARGINAL TAX RATES BY STATE
(Percent)

State	Marginal Tax Rates
Alabama	37.3
Alaska	40.2
Arizona	40.9
Arkansas	38.0
California	40.1
Colorado	37.6
Connecticut	43.1
Delaware	39.7
Florida	37.6
Georgia	38.0
Hawaii	38.2
Idaho	39.3
Illinois	38.8
Indiana	39.2
Iowa	41.9
Kansas	37.0
Kentucky	38.8
Louisiana	39.3
Maine	39.9
Maryland	38.6
Massachusetts	40.3
Michigan	34.0
Minnesota	40.3
Mississippi	37.3
Missouri	38.3
Montana	38.5

Exhibit 3-4

TOTAL CORPORATE MARGINAL TAX RATES BY STATE
(Percent)

(continued)

State	Marginal Tax Rates
Nebraska	38.4
Nevada	34.0
New Hampshire	39.3
New Jersey	39.9
New Mexico	39.0
New York	39.9
North Carolina	38.6
North Dakota	40.9
Ohio	39.9
Oklahoma	37.3
Oregon	38.4
Pennsylvania	39.6
Rhode Island	39.9
South Carolina	37.3
South Dakota	34.0
Tennessee	38.0
Texas	34.0
Utah	37.3
Vermont	39.4
Virginia	38.0
Washington	34.0
West Virginia	40.2
Wisconsin	39.2
Wyoming	34.0
Standard Value	38.5

Source: The Book of the States, 1990-1991 edition. Based on a marginal Federal tax rate of 34 percent and State marginal corporate tax rates for 1990.

c. Annual Inflation Rate

ABEL uses the annual inflation rate to convert a firm's historic financial data into equivalent inflation-adjusted, future-year dollars. The standard value ABEL uses is based on the U.S. Gross National Product (GNP) price deflator.[19] Exhibit 3-5 provides the raw U.S. GNP implicit price deflators and their year-to-year percentage changes. ABEL's standard value for the ten year period ending in 1990 is 4.4 percent.[20] You should not change this value without a good reason. The box below illustrates how to change the standard value.

```
Enter the number of the item you wish to have changed
(e.g. 1 for Reinvestment Rate).
3

3.     Inflation Rate (%)                = 4.4
Please enter the new value.
3.4
```

Exhibit 3-5

---

[19] This measure of inflation is more generalized than that used in BEN. Specifically, BEN uses Chemical Engineering's "Plant Cost Index" (PCI) because it accurately reflects the costs of activities associated with pollution control expenditures. Unlike BEN, the majority of cash flows that ABEL inflates correspond to the firm as a whole. Thus, the inflation rate used in ABEL is tied to the economy-wide inflation rate, not just the inflation rate for capital equipment.

[20] In general, an annual inflation rate is calculated as follows:

$$\left| \left[\frac{\text{Index in final year}}{\text{Index in initial year}} \right]^{1/N} - 1 \right| * 100$$

Where: N = Final year - Initial year

To obtain the standard value, index values for 1990 and 1980 (131.5 and 85.7, respectively) were used to calculate the ten-year average. The calculation is:

$$\left| \left[\frac{131.5}{85.7} \right]^{1/10} - 1 \right| * 100$$

$$= (1.044 - 1) * 100$$

$$= 4.4 \text{ percent}$$

U.S. HISTORIC INFLATION RATE

Year	Implicit Price Deflator Using U.S. GNP (1982 = 100)	Year to Year Change
1968	37.7	NA
1969	39.8	5.6%
1970	42.0	5.5%
1971	44.4	5.7%
1972	46.5	4.7%
1973	49.5	6.5%
1974	54.0	9.1%
1975	59.3	9.8%
1976	63.1	6.4%
1977	67.3	6.7%
1978	72.2	7.3%
1979	78.6	8.9%
1980	85.7	9.0%
1981	94.0	9.7%
1982	100.0	6.4%
1983	103.9	3.9%
1984	107.7	3.7%
1985	110.9	3.0%
1986	113.8	2.6%
1987	117.4	3.2%
1988	121.3	3.3%
1989	126.3	4.1%
1990	131.5	4.1%

Source: Economic Report of the President, February, 1991.

d. Discount Rate

ABEL uses the discount rate to express the firm's expected future cash flows in present value terms.[21] ABEL uses a standard discount rate value of 12.1 percent. This value represents an estimate of the weighted-average-cost-of capital (WACC) over the past ten years ending in 1990, for an average firm. The formula used to calculate the WACC for each year is:

$$WACC = \left| [CBA * (1.0 - TR)] * W_D \right| + \left| [TB + R] * W_E \right|$$

where:

CBA = Ten-Year Average return on Corporate Bond

TR = Marginal Corporate Tax Rate

W_D = Fraction of total financing made up of debt

TB = Ten-Year Average return on Treasury Bonds

R = Equity risk premia

W_E = Fraction of total financing made up of equity

Exhibit 3-6 displays the key aspects of the WACC calculation. This standard value will be modified annually. You should not change this variable unless you consult with a financial analyst. The box below illustrates how to change the standard value.

```
Enter the number of the item you wish to have changed
(e.g. 1 for Reinvestment Rate).
4

4.    Discount  Rate (%)              = 12.1
Please enter the new value.
8
```

[21] The concept of discounting is discussed in the BEN User's Manual, July 1990. The essential aspect of this concept is that a dollar which you receive today is worth more than a dollar that you receive a year from now. For example, you could take a dollar that you receive today and put it in the bank. In one year, the value of this dollar will have increased as a result of interest earned.

ABEL uses the WACC because the model discounts the firm's overall cash flows, rather than those associated with a particular project. The WACC is appropriate since it is the standard discount rate used to evaluate a firm's overall cash flow.[22]

e. Weighted Average Smoothing Constant

The weighted average smoothing constant (WASC) is used to weight the financial data when producing an estimate of future cash flow. The standard value WASC used by ABEL is 0.3. You should not change this value unless advised to do so by the ABEL program during the Phase II analysis.

```
Enter the number of the item you wish to have changed
(e.g. 1 for Reinvestment Rate).
5

5.     Weighted Average Smoothing Constant        =    .3
Please enter the new value.
.7
```

[22] Like the inflation rate, the discount rate used in ABEL is different from that used in BEN. This difference results from finance theory which dictates that the discount rate should reflect the risk of cash flows being analyzed. BEN is concerned with discounting the cash flows resulting from a 100% equity financed pollution control investment. Thus, the equity cost of capital is the appropriate discount rate for that model's cash flows. ABEL evaluates all cash flows of a firm, therefore, the weighted-average-cost-of-capital is appropriate.

Exhibit 3-6

WEIGHTED AVERAGE COST OF CAPITAL CALCULATIONS

YEAR	CORPORATE BOND AVERAGE[1]	TAX RATE[2]	AT DEBT COST	FRACTION OF DEBT [3]	TEN YEAR T BOND[4]	RISK PREMIA[5]	EQUITY COST[6]	FRACTION OF EQUITY[3]	WACC
1981	15.06	0.496	7.59	0.51	13.91	7.1	21.01	0.49	14.17
1982	14.94	0.496	7.53	0.53	13.00	7.1	20.10	0.47	13.44
1983	12.78	0.496	6.44	0.48	11.10	7.1	18.20	0.52	12.56
1984	13.49	0.496	6.80	0.50	12.44	7.1	19.54	0.50	13.17
1985	12.05	0.496	6.07	0.50	10.62	7.1	17.72	0.50	11.90
1986	9.71	0.496	4.89	0.43	7.67	7.1	14.77	0.57	10.52
1987	9.91	0.384	6.10	0.39	8.39	7.1	15.49	0.61	11.83
1988	10.18	0.384	6.27	0.47	8.85	7.1	15.95	0.53	11.40
1989	9.66	0.384	5.95	0.44	8.49	7.1	15.59	0.56	11.35
1990	9.77	0.385	6.01	0.47	8.55	7.1	15.65	0.53	11.12
10 YEAR AVERAGE	11.76		6.37		10.30		17.40		**12.14**

[1] This is the average interest rate paid on corporate bonds. Moody's Bond Record, January 1981 - January 1989, and Table 1.35, Federal Reserve Bulletin, March 1991.

[2] For further explanation of how the average total corporate marginal tax rate is calculated, see pages III-23 to III-25 in the BEN User's Manual.

[3] These weights represent the fraction of financing that is made up of debt or equity. The weights are constructed using data from Standard and Poor's Stock Analyst's Handbook. The equity indexes are adjusted to reflect their market value.

[4] Treasury bond data from Table 1.35, Federal Reserve Bulletin, March 1991 and earlier issues.

[5] This is the arithmetic mean of the long-term equity risk premium for 1926-1990 calculated by Ibbotson Associates.

[6] For further explanation of the calculation of equity cost of capital, see page III-30 of the BEN User's Manual.

Exhibit 3-7 displays the weights for three, four and five years of data, using a weighted average smoothing constant of 0.3. As this exhibit shows, when using three years of data, the relative contributions to the firm's projected cash flow are 46 percent for the most recent year, 32 percent for the second year, and 22 percent for the third year. If you change the constant to a value greater than 0.3, increased emphasis will be placed on the more recent data.

Exhibit 3-7

WEIGHTS ASSIGNED TO EACH YEAR OF DATA
WHEN THE WEIGHTED-AVERAGE SMOOTHING CONSTANT EQUALS 0.3

Year (1 = most recent)	Weights for 3 Years of Data	Weights for 4 Years of Data	Weights for 5 Years of Data
1	0.46	0.39	0.36
2	0.32	0.28	0.25
3	0.22	0.19	0.18
4	--	0.14	0.12
5	--	--	0.09

4. Effect of Changes to Standard Value Variables

Exhibit 3-8 summarizes each standard value used in the Phase II analysis, as of June 1991. As previously noted, the standard values for the marginal income tax rate, annual inflation rate, and discount rate will be revised annually. The reinvestment rate and the weighted average smoothing constant, however, will not be changed.

Exhibit 3-8

PHASE II
STANDARD VALUE INPUT VARIABLES

(June 1991)

Variable	Value
Reinvestment Rate	0.00
Marginal Income Tax Rate	38.5%
Annual Inflation Rate	4.4%
Discount Rate	12.1%
Weighted Average Smoothing Constant	0.3

Exhibit 3-9 summarizes how changing standard values affects the ability to pay analysis. The effect noted for each variable indicates the direction in which ABEL's results would change, if the values of all other variables were held constant.

Exhibit 3-9

IMPACT OF CHANGES OF VARIABLE STANDARD VALUES
(Holding All Other Variables Constant)

Variable	Direction of Change	Impact on Ability to Pay
Reinvestment Rate	Increase	Decrease levels of affordable penalties and investments
Marginal Tax Rate	Increase	Increase levels of affordable investments and penalties (provided tax deductible expenditures are required)
Inflation Rate	Increase	Increase levels of affordable investments and penalties*
Nominal Discount Rate	Increase	Decrease levels of affordable investments and penalties
Weighted Average Smoothing Constant	Increase	Indeterminate**

Note: If the firm's future projected pre-tax cash flow is less than zero, the direction of the change will be opposite of what is stated above.

* The impact of changes in the inflation rate may vary from one specific case to another, depending on the relative values of the other variables. Overall, however, an increase in the inflation rate will result in increased net cash flows.

** The effect of the weighted average smoothing constant on ability to pay depends on specific pre-tax cash flow and income figures.

5. Phase II Data Verification Checks

As with the Phase I inputs, ABEL checks the Phase II values to ensure they are in the correct format and to test for invalid relationships among variables. For each input, an acceptable value must be entered before ABEL will allow you to proceed with the next input value.

Criteria for Phase II data are as follows:

- Every input must be either a number or a B, H, or Q.

- All Phase II inputs, with the exception of the annual costs, must be greater than or equal to zero. If an input's value does not meet this condition, ABEL will state the following:

```
2. Enter the proposed lump-sum settlement penalty in Thousands.
If there is no proposed penalty, enter a zero.
-100

ERROR: THIS INPUT CANNOT BE A NEGATIVE NUMBER. PLEASE ENTER AGAIN.

2. Enter the proposed lump-sum settlement penalty in Thousands.
If there is no proposed penalty, enter a zero.
```

- The weighted average smoothing constant must be greater than (but not equal to) zero and less than 1.0. If this criterion is not met, the weights which ABEL uses will be nonsensical. To prevent this situation from occurring, ABEL will ask you to enter an acceptable smoothing constant by stating:

```
5.  Weighted Average Smoothing Constant      =  .3
Please enter the new value.
1.2

ERROR: THE SMOOTHING CONSTANT MUST BE BETWEEN ZERO AND ONE.
PLEASE ENTER AGAIN.

5.  Weighted Average Smoothing Constant      =  1.2
Please enter the new value.
```

- The discount rate must always be greater than the inflation rate. If this condition is not

satisfied, it implies an unrealistic situation where real (i.e., excluding inflation) interest rates are less than zero. If the discount rate does not satisfy this condition, ABEL will state:

```
4.  Discount  Rate (%)              =  12.1
Please enter the new value.
3.0

ERROR: THE DISCOUNT RATE MUST ALWAYS BE GREATER THAN THE INFLATION RATE.
PLEASE ENTER AGAIN.

4.  Discount  Rate (%)              =  3.0
Please enter the new value.
```

- The marginal income tax rate must be greater than or equal to zero and less than 100 percent. If this condition does not hold, ABEL will state:

```
2.  Marginal Income Tax Rate (%)    =  38.5
Please enter the new value.
101

ERROR: THE MARGINAL TAX RATE MUST BE BETWEEN ZERO AND ONE HUNDRED
PERCENT.  PLEASE ENTER AGAIN.

2.  Marginal Income Tax Rate (%)    = 101.0
Please enter the new value.
```

After you have collected and entered your inputs, ABEL will provide an evaluation of the firm's ability to pay an environmental expenditure and/or a civil penalty. This chapter describes how to interpret ABEL results for both Phase I and Phase II.

A. PHASE I ABEL ANALYSIS

1. Background

Phase I of ABEL generates five financial ratios for each year of tax return data. Financial ratios are commonly used by analysts to evaluate a firm's viability and its financial structure. ABEL indicates whether the firm's ratios are better or worse than target (or threshold) values for each year, and briefly summarizes the implications of ratios' values.[23] ABEL also provides an overall assessment that incorporates all of the firm's ratio results for the most recent year of tax return data.

[23] ABEL's target values come from a variety of sources and were chosen because they are generic, non-industry-specific standards that are commonly applied. One of the sources used is Financial Tests as an Option for Demonstrating Financial Responsibility, Volume II: Text, by International Research and Technology Corporation, November 25, 1980. More sophisticated users may want to compare the ratio results to those specifically calculated for the firm's industry or evaluate ratio results over time. This information may be found, for example, in Dun and Bradstreet industry summary financial data.

If all of the firm's ratios are strong relative to the target values and do not show significantly deteriorating trends, the firm is most likely currently in good financial health. If only some of the ratios show acceptable values however, the firm's situation may be more uncertain. Poor ratios do not necessarily indicate that a firm will be unable to pay proposed environmental expenditures. The Phase I ratio analysis should always be used in conjunction with the conclusions drawn from the Phase II analysis.

The five key financial health indicators calculated by ABEL are: (1) the debt to equity ratio, (2) the current ratio, (3) the times interest earned ratio, (4) Beaver's ratio, and (5) Altman's Z-Score. The interpretation of each of these ratios is shown below and the method for calculating each ratio is presented in Appendix B. For Phase I, ABEL provides the following outputs:

1. A summary table of the five ratios for each year of tax return data.

2. An explanation of the individual ratios, including a comparison of the firm's ratios with the ABEL target values.

3. A comparison of the most recent year's financial ratios with the firm's average historic ratios. ABEL will alert you when, for a specific ratio, the most recent year's value is significantly better or significantly worse than the historical average. ABEL will not perform this test unless you supply at least three years of data.

4. An overall conclusion regarding the firm's financial condition based on ratios from the most recent year.

Each type of output is described in detail below.

2. Sample Output

Once you have entered all of the tax data, ABEL will produce the following statement:

```
ABEL is ready to begin Phase I output.

Please enter a carriage return to continue.
```

a. Summary Table of Historical Financial Ratios

After entering a carriage return, ABEL will provide a summary table showing the firm's ratio results. A sample summary table is provided below.

Firm's Name: XYZ Corporation Date: February 23, 1991

HISTORICAL FINANCIAL RATIOS

	1988	1987	1986	1985	1984
Debt to Equity	2.00	1.60	1.00	0.90	0.80
Current Ratio	0.90	1.80	2.00	2.20	2.02
Times Int. Earned	1.20	*****	1.90	2.30	2.10
Beaver's Ratio	0.07	0.10	0.19	0.21	0.23
Altman Z'-Score	1.14	1.20	2.30	3.00	3.15

Note: "*****" means that ABEL could not compute a value.
Refer to the detailed ratio presentation for an explanation.

Do you wish to see a detailed explanation of these ratios?
(Y = Yes; N = No, go directly to Phase I conclusions)
Please enter choice:
Y

The most recent year's data will always be in the left-most column. If you have provided fewer than five years of data, the table will only display the relevant number of data columns, rather than the five shown in the above example.

In certain circumstances, ABEL will show a value of "*****". The value of "*****" appears when ABEL is not able to calculate that financial ratio for mathematical reasons, such as trying to divide by zero. In some instances, "*****" is an indication of poor financial health, such as a firm having zero assets. In other instances, it may be a sign of strong financial condition. For example, the Times Interest Earned ratio would show "*****" when a firm has no interest expense. In each of these cases, ABEL's detailed financial ratio explanation will also show a "*****".

b. Detailed Explanation of Financial Ratios

You can receive a more detailed explanation of the financial ratios by responding **Y** at the appropriate prompt. If you select **N**, ABEL will print a summary of the Phase I conclusions. This summary is described later in the chapter. The following box illustrates the detailed output for the first ratio, the Debt to Equity ratio.

		1988	1987	1986	1985	1984
Debt to Equity	2.0	1.6	1.0	0.9	0.8	

The debt to equity ratio (D/E) is defined as the firm's total liabilities divided by its stockholders' equity. This ratio measures the degree to which debt constitutes the company's financing.

A D/E less than 1.5 but greater than or equal to zero generally indicates that a firm has additional debt capacity. This firm's D/E fell into this category in 1986, 1985, 1984.

A D/E greater than 1.5 generally indicates that a firm may have difficulty borrowing additional capital. The firm's D/E fell into this category in 1988, 1987

Enter a carriage return to continue with individual ratio analysis.

Slight variations in the above screen can occur as a result of the firm's financial condition. For example, if the firm's D/E ratio is below 1.5 for all years, the third paragraph indicating the years that the firm may have difficulty borrowing additional capital will not appear. Similarly, if the D/E ratio is above 1.5 for all years, the second paragraph indicating the years that the firm has additional debt capacity will not appear. Similar variations will occur in the explanations of the other ratios.

The following boxes illustrate the detailed explanations for the four additional ratios calculated by ABEL:

	1988	1987		1986	1985	1984
Current Ratio	0.9	1.8	2.0	2.2	2.0	

The current ratio (CR) is defined as the firm's current assets divided by its current liabilities. The ratio assesses whether the firm will be able to cover its short-term debts using cash and other current assets which can be easily liquidated.

A CR greater than 2.0 generally indicates that a firm has good liquidity. This firm's CR was strong in 1986, 1985, 1984.

A CR between 1.0 and 2.0 indicates that the firm may suffer from liquidity problems. This firm's CR was unfavorable in 1987.

A CR less than 1.0 indicates that the firm has serious liquidity problems. This firm's CR was poor in 1988.

Enter a carriage return to continue with individual ratio analysis.

	1988	1987	1986	1985	1984
Times Int. Earned	1.2	*****	1.9	2.3	2.1

The times interest earned ratio (TIE) is defined as the firm's earnings before interest and taxes divided by its interest expense payments. This ratio indicates how easily the firm can pay the interest expense on its debt.

A TIE greater than 2.0 generally indicates that the firm is able to meet its interest payments. This firm fell into this category in 1985, 1984

A TIE less than 2.0 indicates that the firm may have trouble meeting future interest payments. As the TIE decreases, the likelihood and potential severity of the firm experiencing problems in meeting those payments increase. This firm's TIE was unfavorable in 1988, 1986.

A TIE of "*****" indicates that the firm had no interest expense in that year.

Enter a carriage return to continue with individual ratio analysis.

		1988	1987	1986	1985	1984
Beaver's Ratio	0.07	0.10	0.19	0.21	0.23	

Beaver's ratio (BR) is defined as the firm's after-tax cash flow divided by its total liabilities. The BR provides a useful measure for predicting a firm's long-term solvency and likelihood of staying in business. In particular, the BR indicates whether the firm's internally generated cash flow is sufficient to meet its current and long-term financial obligations.

A BR greater than 0.20 generally indicates that the firm is solvent and healthy. This firm fell into this category in 1985, 1984.

A BR between 0.1 and 0.2 is inconclusive. This situation applied to this firm in 1986.

A BR less than 0.1 generally indicates poor financial health. This firm fell into this category in 1988, 1987.

Enter a carriage return to continue with individual ratio analysis.

		1988	1987	1986	1985	1984
Altman Z-Score	1.14	1.20	2.30	3.00	3.15	

Altman's Z-Score (AZS) is calculated as a weighted average of several financial ratios. AZS is a predictor of firm failure. It is most accurate within two years prior to bankruptcy.

An AZS greater than 2.90 indicates that it is unlikely that the firm will be forced into bankruptcy during the coming two years. This firm's AZS fell into this category in 1985, 1984.

An AZS less than 1.23 indicates that the firm could be bankrupt within the next two years if its financial situation does not dramatically improve. This firm's AZS fell into this category in 1988, 1987.

An AZS between 1.23 and 2.90 is inconclusive. This situation applied to this firm in 1986.

Enter a carriage return to see Phase I conclusions.

c. Historic Ratio Comparison

When providing the detailed explanations of the individual ratios, ABEL compares the most recent ratios with the historic averages. Specifically, these tests determine if any of the ratios from the most recent year of tax return data are significantly better (more than 50% higher) or significantly worse (more than 50% lower) than the historic averages.[24] A statement will appear in the detailed explanations when the ratio is significantly better or worse than the average.

d. Summary Phase I Conclusion

After providing the detailed ratio explanations (or immediately after the summary table, if the detailed output is skipped), ABEL provides a Phase I scenario conclusion. The conclusion is based on the five financial ratios for only the most recent year. If, however, one or more of the financial ratios is significantly worse than the firm's historic average and the Phase II analysis shows that the firm is unable to pay for environmental expenditures, you may want to consult with a financial analyst to determine the cause of the decline.[25]

```
================================================

      This firm's most recent year's financial ratios indicate that
      the firm's financial condition is extremely poor.  In addition,
      the firm may have difficulty obtaining additional debt financing.

================================================
```

[24] The most recent year's ratio value is excluded from the computation of the historic average. Also, for the debt to equity ratio, the definitions of significantly better and significantly worse are reversed.

[25] As previously noted, one of the techniques used by financial analysts to assess changes in a firm's financial health is to examine historic financial ratio trends, like those produced by ABEL at the beginning of this section. Note that the Phase I overall conclusion does not analyze these trends, however, as it only assesses the firm's ratios for the most recent year.

B. PHASE II ABEL ANALYSIS

1. Overview

Phase II of the ABEL program quantifies the firm's ability to pay for an environmental expenditure. To make this determination, ABEL uses the three to five years of tax return data from Phase I to project five years of internally generated, after-tax cash flows. ABEL then compares the "present value" of these cash flows with the "present value" of the after-tax cash flows following the environmental expenditures that you have specified.[26] After making the environmental expenditures, if the present value of the firm's remaining projected cash flows is still positive, ABEL will predict that the firm can afford the expenditure.

While the general methodology for determining a firm's ability to pay is straightforward, the actual details of the calculations are quite complex. Appendix B provides the detailed equations used in Phase II, as an aid to financial analysts and for other interested users. It is not necessary, however, to read Appendix B. All that is needed to successfully use the ABEL program is contained in the main section of this manual.

ABEL will produce a Summary Table when enough data exists to perform a Phase II analysis. If you would like an explanation of this summary, ABEL can be prompted to produce one. ABEL then evaluates the probability that the firm can afford the environmental expenditures that you have proposed. Lastly, ABEL will indicate whether the results might be overly optimistic. This scenario occurs when the most recent year's cash flows are substantially less than average. Following the summary analysis, you can choose to perform additional analysis, revise your Phase II input data, or continue with the program.

---

[26] The concept of net present value is based on the principle that "a dollar today is worth more than a dollar a year from now," because today's dollar can be invested immediately to earn a return over the coming year. Therefore, the earlier a cost (or benefit) is incurred, the greater its economic impact. ABEL accounts for this "time value of money" effect by reducing all estimated future cash flows to their present value equivalents. This widely-used technique is known as discounting.

2. ABEL Summary Analysis

After you have entered your Phase II inputs, ABEL provides the following message:

> ABEL can now analyze the ability of XYZ Corporation
> to pay for pollution control expenditures and a penalty.
>
> Enter a carriage return when you are ready for the ABEL SUMMARY ANALYSIS.

This message will vary depending on whether you have supplied ABEL with a penalty, pollution control expenditures, or both. In this case the user supplied both.

a. Phase II Summary Table

First, ABEL produces a table showing the present value of the firm's projected cash flows over five years, both including and excluding the environmental expenditures that you specified. This table will be the focus of almost all ABEL analyses.

ABEL SUMMARY ANALYSIS

CASE: XYZ Corporation — Date: February 23, 1991 — Units: Thousands

Prob-ability (1)	Total ABEL Cash Flow Generated (2)	ABEL Cash Flow Net of Pollution Control Expenditures (3)	ABEL Cash Flow Net of P.C. Expenditures & Penalty (4)
50%	7972.	7612.	6612.
60%	7281.	6920.	5920.
70%	6496.	6135.	5135.
80%	5433.	5073.	4073.
90%	2934.	2573.	1573.
95%	0.	0.	0.
99%	0.	0.	0.

Since the firm's projected cash flows are based on a statistical extrapolation of the firm's historical cash flows, the table shows projected cash flows at seven different probability levels. These probabilities reflect the likelihood that the firm will equal or exceed the specified level of cash flow.

In Column 2 of this table, the firm's projected after-tax cash flows are listed. These values do not take any environmental expenditures or penalties into consideration.[27] Column 3 reflects the cash flows listed in Column 2, minus any environmental expenditures. Thus, these values take both the expenditures and their tax consequences into account. Column 4 represents Column 3 minus the proposed civil penalty.

Following the table, ABEL prints a message summarizing the firm's ability-to-pay:

> ABEL projects that there is a 91.9% probability that XYZ Corporation can finance a penalty of $1000, a total initial pollution control investment of $525 and annual pollution control expenses of $10 through the funds the company generates over the next five years. All figures are expressed in Thousands and 1991 year-dollars.

This message indicates the probability that the firm can meet the proposed penalty (and/or pollution control expenditure) through its projected cash flows.

[27] The values listed in column 2 are the present-values of five years of projected cash flows.

b. Detailed Explanation of the Components of the Summary Analysis

After printing the above table and message, ABEL will ask whether you would like an explanation of any of the information in the ABEL Summary Analysis.

> Would you like an explanation of any of the information in the ABEL SUMMARY ANALYSIS? (Y = yes, N = No)
> **Y**

If your response is affirmative, ABEL will respond:

> The ABEL SUMMARY ANALYSIS shows the funds that XYZ Corporation can generate internally over the next five years to pay for pollution control expenditures and penalties. These funds, or cash flows, are expressed in 1991 dollars. The ABEL SUMMARY ANALYSIS shows the total funds available (col. 2), funds available net of pollution control expenditures (col. 3), and the funds available net of pollution control expenditures and the proposed penalty payment (col. 4).
>
> Which column of the ABEL SUMMARY ANALYSIS would you like explained in more detail?
>
> 1. Probability
> 2. Total ABEL Cash Flow (C.F.) Generated
> 3. ABEL C.F. Net of Pollution Control (P.C.) Expenditures
> 4. ABEL C.F. Net of P.C. Expenditures and Penalty Payment
> 5. None. I want to proceed with the Phase II analysis.

If you select Column 1, ABEL will provide the following information:

> Column (1) in the ABEL SUMMARY ANALYSIS defines the likelihood that a particular row's cash flows will occur. For example, there is a 90% probability that XYZ Corporation can generate total cash flows of 2934 (col. 2), cash flows net of pollution control expenditures of 2573 (col. 3), and cash flows net of pollution control expenditures and penalty payment of 1573. (col. 4).

If you select Column 2, ABEL will provide the following information:

> Column (2) in the ABEL SUMMARY ANALYSIS shows the total cash flow that ABEL predicts is available for penalty payment and pollution control expenditures. ABEL provides you with a range of cash flows that might be generated based on its statistical analysis. Thus there is a 50% probability that XYZ Corporation can generate total cash flows of 7972, and a 90% probability that XYZ Corporation can generate total cash flows of 2934.

If you select Column 3, ABEL will provide the following information:

> Column (3) in the ABEL SUMMARY ANALYSIS shows the total cash flow that ABEL predicts is available after pollution control expenditures. If there are no pollution control expenditures or annual costs in your Phase II analysis, then Column (3) should equal Column (2). ABEL provides you with a range of cash flows that might be generated based on its statistical analysis. Thus there is a 50% probability that XYZ Corporation can generate total cash flows after pollution control expenditures of 7612 and a 90% probability that XYZ Corporation can generate total cash flows after pollution control expenditures of 2573.

If you select Column 4, ABEL will provide the following information:

> Column (4) in the ABEL SUMMARY ANALYSIS shows the total cash flow that ABEL predicts is available after pollution control expenditures and penalty payment. If there are no penalty payments in your Phase II analysis, then Column (4) should equal Column (3). ABEL provides you with a range of cash flows that might be generated based on its statistical analysis. Thus there is a 50% probability that XYZ Corporation can generate total cash flows after pollution control expenditures and penalty payment of 6612. and a 90% probability that XYZ Corporation can generate total cash flows after pollution control expenditures and penalty payment of 1573.

If you choose option 5, ABEL will proceed with the Phase II analysis. If you chose option 1, 2, 3, or 4, however, ABEL will provide the appropriate explanation before again asking which column you would like explained in more detail. This process will continue until you choose option 5.

c. Determining If the Violator Can Pay at the 70 Percent Probability Level

If the ABEL analysis indicates that a firm cannot afford the penalty and/or environmental expenditures at the 70 percent probability level, the model will provide the following message:

> Note that ABEL's calculations indicate that while XYZ Corporation will be able to generate funds over the next five years, there is less than 70% certainty that those funds will be sufficient to cover the proposed pollution control expenditures and/or penalty payment. You should review all of your Phase I tax form data inputs. If these inputs are correct, then you or a financial analyst should review the company's tax returns to determine if there have been excessive nonessential expenses or assets are available to support the pollution control expenditures and/or penalty payment. If there are no other sources of funds, you can consider reducing the civil penalty.

A 70 percent probability is used because this is one common agency cut off for determining ability to pay. Note, however, that it is ultimately up to the litigation team to determine an appropriate cutoff. See the ABEL User's Guide for a fuller discussion of this issue.

After printing this message, ABEL will ask the following question:

> Would you like more information on how to evaluate potentially nonessential expenses and other possible sources of funds? (Y= yes, N=no)

If you answer **Y**, ABEL will then print the following message:

> The ABEL User's Guide provides a listing of areas to examine for nonessential expenses and sources of additional funds. These include:
>
> - Compensation of Officers (line 12 and Schedule E of 1989 form 1120)
> - Cash dividends paid out to shareholders (line 5a of Schedule M-2 of 1989 form 1120)
> - Contributions to charitable and other organizations (line 19 of 1989 form 1120)
> - Loans to stockholders (line 7d of Schedule L of 1989 form 1120)
> - Nonessential assets which can be sold
>
> If XYZ Corporation is a subsidiary of another company and it files its own tax returns, then if possible, you should also perform a Phase I and Phase II analysis using the parent company's tax returns.

d. Historic Comparison

Next, ABEL performs two tests to determine if the firm's most recent year's actual cash flow (derived from the firm's tax return) was significantly worse than its historic average. If the firm fails either of these tests, ABEL will print:

> Based on the tax form data provided to ABEL, the most recent year's pre-tax cash flow for XYZ Corporation is significantly worse than its inflation-adjusted historic average. If this poor cash flow were to continue in the future, then the ABEL SUMMARY ANALYSIS cash flow figures are overly optimistic. Therefore, ABEL strongly recommends that when you have completed this Phase II analysis, you re-run Phase II using a smoothing constant of 0.7 (Standard Value 5 in the Phase II input section). This larger smoothing constant will weight the most recent year's cash flow much more heavily than those of other years' in the ABEL SUMMARY ANALYSIS cash flow calculations.

This message is the only situation where ABEL will recommend that you change the weighted average smoothing constant standard value. This value should not be changed otherwise, unless a financial analyst reviews the data and recommends that it be changed.

3. Other Phase II Analysis Options

Having completed the Phase II Summary Analysis, ABEL will offer you the option of conducting further Phase II analyses:

What further Phase II analysis would you like?

1. Calculate the annual penalty amount for a penalty which is to be spread over more than one year.
2. ABEL's evaluation of historical cash flows.
3. A more detailed version of the ABEL SUMMARY ANALYSIS.
4. Modify Phase II input values.
5. None of the above. Proceed to ABEL Output Menu.

Each option is described below.

a. Option 1: Penalty Payment Over More than One Year

Option "1" should be run if you are considering a penalty payment scheme where the violator pays the penalty over several years. Spreading the penalty over several years (ABEL allows you to spread it over two to five years) does not affect any of the ABEL Summary Analysis values. The probability that a firm can afford to pay the environmental expenditures and/or civil penalty remains exactly the same.[28] When you select option "1", ABEL will state:

> Rather than paying a single lump-sum penalty at the beginning of 1991,
> XYZ Corporation could spread payment of that penalty over several years
> in equal installments. The first installment would occur in 1991
> and the remaining installments would occur at the same time in each of
> the following years.
>
> ==========
>
> Over how many years would you like to spread the penalty?
> (Select an integer value greater than 1 and less than or equal to 5.)
> **3**

In response you should select 2, 3, 4 or 5 years. Then ABEL will state:

> A lump-sum settlement penalty of $ 1,000,000 (expressed in 1991
> dollars) is exactly equal to 3 years of annual payments of $ 372,047.

[28] The stream of annual penalty payments is calculated so that its present value is the same as the lump-sum penalty payment that was specified in the input section.

In this example, the user asked ABEL to spread a penalty amount of $1,000,000 (1991 dollars) over 3 years. ABEL calculated that the three annual payments should be $372,047.

b. Option 2: Historical Cash Flow Information

If you choose option "2", ABEL will provide a table showing the firm's cash flows from the historical data that were provided. This table assists a financial analyst in understanding the relationship between the firm's historical and projected cash flows.

```
ABEL is ready to present an analysis of historic cash flows for
XYZ Corporation.  Enter a carriage return when you are ready.
```

After you have entered a carriage return, ABEL provides the following table:

```
                    ABEL's HISTORICAL CASH FLOW ANALYSIS

CASE: XYZ Corporation      Date: February 23, 1991          Units: Thousands

                                                          Inflation-Adjusted
Year                              Pre-tax Cash Flow       Pre-tax Cash Flow

1989                                    3000.                   3301.
1988                                    1570.                   1812.
1987                                    1400.                   1695.

Would you like an explanation of ABEL's HISTORICAL CASH FLOW ANALYSIS?
(Y=yes, N=no)
Y
```

If you indicate that you would like an explanation of this table by responding **Y**, ABEL will state:

> Column (1) shows the historic pre-tax internally-generated cash flows by year for XYZ Corporation expressed in their respective years' dollars. Column (2) shows the same pre-tax cash flow values, but expressed in 1991 dollars so that they can be compared on an inflation-adjusted basis. Both columns are based on the tax return data which you have entered.

c. Option 3: Detailed ABEL Summary Analysis

If you choose option "3", ABEL will provide a more detailed version of the Summary Analysis presented at the beginning of Phase II:

DETAILED ABEL SUMMARY ANALYSIS

CASE: XYZ Corporation Date: February 23, 1991 Units: Thousands

Prob-ability	Total ABEL Cash Flow Generated	Initial Pollution Control Cash Flow	Annual Pollution Control Cash Flow	ABEL Cash Flow Net of Pollution Control Expenditures
50%	7972.	335.	26.	7612.
60%	7281.	335.	26.	6920.
70%	6496.	335.	26.	6135.
80%	5433.	335.	26.	5073.
90%	2934.	335.	26.	2573.
95%	0.	335.	26.	0.
99%	0.	335.	26.	0.

Immediately following this detailed summary analysis, ABEL will ask if you would like any of the columns explained:

Which column of the DETAILED ABEL SUMMARY ANALYSIS would you like explained in more detail?

1. Probability
2. Total ABEL Cash Flow (C.F.) Generated
3. Initial Pollution Control (P.C.) C.F.
4. Annual Pollution Control C.F.
5. ABEL C.F. Net of P.C. Expenditures
6. None. I want to proceed with the Phase II analysis.

If you select Column 1, ABEL will provide the following information:

Column (1) in the DETAILED ABEL SUMMARY ANALYSIS defines the likelihood that a particular row's cash flows will occur. For example, there is a 90% probability that XYZ Corporation can generate total cash flows of 2934. (col. 2), and cash flows net of pollution control expenditures of 2573. (col. 5).

If you select Column 2, ABEL will provide the following information:

> Column (2) in the DETAILED ABEL SUMMARY ANALYSIS shows the total cash flow that ABEL predicts is available for penalty payment and pollution control expenditures. ABEL provides you with a range of cash flows that might be generated based on its statistical analysis. Thus, there is a 50% probability that XYZ Corporation can generate total cash flows of 7972, and a 90% probability that XYZ Corporation can generate total cash flows of 2934.

If you select Column 3, ABEL will provide the following information:

> Column (3) in the DETAILED ABEL SUMMARY ANALYSIS shows the net total of the initial pollution control investment and the present value of five years' of the related depreciation and deduction tax shields. The values in column (3) are the same for all probability levels.

If you select Column 4, ABEL will provide the following information:

> Column (4) in the DETAILED ABEL SUMMARY ANALYSIS shows the present value of five years' of the after-tax annual costs of the pollution control activity. The values in column (4) are the same for all probability levels.

If you select Column 5, ABEL will provide the following information:

> Column (5) in the DETAILED ABEL SUMMARY ANALYSIS shows the total cash flow that ABEL predicts is available after pollution control expenditures. Column (5) is column (2) minus columns (3) and (4). ABEL provides you with a range of cash flows that might be generated based on its statistical analysis. Thus there is a 50% probability that XYZ Corporation can generate total cash flows after pollution control expenditures of 7612 and a 90% probability that XYZ Corporation can generate total cash flows after pollution control expenditures of 2573.

If you choose option "6", the program will return to the ABEL Optional Phase II Analysis choices. If you choose a 1, 2, 3, 4, or 5, after printing the respective explanation on your terminal, ABEL will again ask which column you would like explained in more detail. This process continues until you choose option "6".

d. Option 4: Modify Phase II Inputs

If you choose option "4" (Modify Phase II input values), ABEL will go to the beginning of the Phase II input section without clearing the values that have already been entered. At this time, you can modify any of the pollution control costs, the penalty, and/or standard value inputs to obtain revised Phase II results.

e. Option 5: None of the Above. Proceed to ABEL Output Menu.

If you choose option "5", ABEL will provide you with an Output Menu. This menu, and other printing and exiting procedures are discussed in detail in Chapter 5.

SAVING, RETRIEVING AND PRINTING ABEL FILES AND EXITING THE PROGRAM

CHAPTER 5

This chapter discusses four important features of the ABEL model: saving data to an input file, retrieving data from an input file, printing ABEL results, and exiting from the program. These features are designed to be flexible and easy to use, serving both novice and experienced users.

A. SAVING DATA TO AN INPUT FILE

One of ABEL's useful features is the option to save your inputs in a file which can be retrieved at a later time. This option allows repeated analysis of a particular firm without retyping all of the inputs. The save option also allows you to save tax data you have already entered, in case you need to leave the program before finishing data entry.

1. Saving Input Data Using the "S" Command

As described in Chapter 2, ABEL allows you to save your Phase I data at any point during data entry by typing **S**. When you type **S**, ABEL will provide the following message:

> Please enter the name of the file in which you would like to save your inputs. Enter a carriage return to cancel.

At this point, type the name of the file in which you want to save the firm's data. Your file name can be up to eight letters followed by a period, followed by three more letters. The file name you choose should clearly indicate to which case the file pertains. We recommend that you use the .ABL extension to indicate that the file contains ABEL data. For example, if the company you are analyzing is ABC Corporation, you may want to name your file **ABCCORP.ABL**. If you have more than one file pertaining to a case, you may find it helpful to refer to your list of ABEL files when naming the file. Procedures for reviewing this list of files are described later in this chapter.

2. Saving Input Data When Exiting the Program

To prevent you from accidentally exiting the ABEL program without saving your Phase I data, ABEL will ask if you would like to save your Phase I inputs before quitting the program. For example, if you are in the middle of entering data and you type "**Q**" to exit the program, ABEL asks:

```
12. Please enter Trade Notes and Accounts Receivable Less Bad Debts
(in Thousands)
Q


                *** YOU ARE ABOUT TO EXIT ABEL. ***

Do you want to save your inputs first (Y=yes, N=no)?
```

If you would like to save your data to an input file, type **Y**. ABEL then asks you to name the file. When naming your file, you should follow the directions provided above. If you do not want to save the data that have been entered, type **N** to exit the program.

3. Overwriting an Existing File When Saving Input Data

If you provide ABEL with a filename that already exists, ABEL will ask if you want to overwrite the old file by providing the following message:

```
Please enter the name of the file in which you would like to save your
inputs.  Enter a carriage return to cancel.
ABCCORP.ABL

File already exists.  Do you want to overwrite it (Y/N)?
```

If you type **Y**, ABEL will save your latest set of data inputs to the file. This file will include any inputs added during your most recent ABEL session, as well as any unaltered inputs from the data file that was retrieved during the ABEL session. For example, you can retrieve a data file that contains two years of tax data, add another year of data, and save the file under the original name to save all three years of data. ABEL data entry files will be saved for up to one year on EPA's mainframe computer.

If you type **N** when prompted, ABEL will ask you to type a different filename to save your input data. At this point you may wish to refer to the list of ABEL files in your directory or account. The procedure for obtaining this list is described in the next section.

B. RETRIEVING DATA FROM AN INPUT FILE

If you are planning to use a file from a previous ABEL session, or if you are planning to enter data that will be saved in a new file, it may be helpful to look at the names of the files in your account or directory. Before beginning the ABEL program, you should check the list of ABEL files in your account or directory. To produce this list on the EPA mainframe, type **LIST.CAT** and enter a carriage return before executing the ABEL program. The EPA mainframe will archive any files that are not used for a period of two weeks. This may cause a delay when you go to retreive a file. In addition, the mainframe only saves files for up to one year. If you are using a PC, this list can be produced by typing **DIR/P** followed by a carriage return. It is helpful to write down the name

of each ABEL input file you might want to retrieve while running the program.

After the introduction to the program, ABEL asks if you would like to enter the tax data manually or through a previously created input file:

```
How will you enter data for the ABEL analysis?

   1. Enter data during ABEL session.
   2. Use a previously saved file.

Enter your selection (1 or 2):
```

If you type **2** ABEL asks for the name of the file to be retrieved. Refer to the list you developed prior to the ABEL session to ensure that you type the correct filename.

ABEL is designed so that you can retrieve a partially completed data set, and proceed with the data entry process. After you have retrieved an input file, ABEL will give you the following choices:

```
You have entered data for  1989, 1988.
Which year of data would you like to view?
    Select:
        1. 1989
        2. 1988

        R. Resume entering tax data
```

If you would like to resume entering data, type **R** and ABEL will resume where data entry was last terminated.[29]

C. PRINTING ABEL OUTPUT AND EXITING THE PROGRAM

1. Accessing the ABEL Output Menu

[29] Note that you cannot add data beyond the "most recent year" that you entered in your original data entry session. For instance, if you selected 1989 as the "most recent year", you cannot add 1990 tax data date without re-entering the data for all previous years.

After you have completed both the Phase I and Phase II analyses, ABEL provides additional options for Phase II analysis (See Chapter 4). One of these options is "None of the Above. Proceed with ABEL Output Menu." When this option is selected, ABEL will provide the following menu of choices:

ABEL Output Menu:

Select the data inputs and ABEL results you want saved in a file for printing from the following:

1. Phase I and Phase II Inputs. Entire Phase I and Phase II Results.
2. Phase I and Phase II Inputs. Phase I and Phase II Summary Results.
3. Phase I Inputs. Entire Phase I Results.
4. Phase II Inputs. Entire Phase II Results.
5. None. Proceed with the program.

Each of the first four options generates different output formats for your ABEL results. The first option provides the most information. If this option is selected, you will receive the complete ABEL output for both Phase I and Phase II. The second option restricts the output to the summary analyses from each phase of the program. The third and fourth options restrict the output to Phase I and Phase II, respectively. With one exception, ABEL also includes both your Phase I and Phase II inputs with the printout of your results.[30]

[30]If you type **3**, indicating that you want only the Phase I output, ABEL includes your Phase I but not your Phase II inputs.

2. Concluding an ABEL Analysis

After you have selected a print option, ABEL provides the following message:

> How would you like to proceed with your ABEL analysis of XYZ Corporation ?
>
> 1. Modify Phase I input values.
> 2. Clear data inputs: evaluate a different case.
> 3. Conclude this ABEL Session.

If you choose **1**, indicating that you want to modify your Phase I inputs, ABEL allows you to choose the year of data you wish to review, to go on with Phase I, or to quit the program. If you type **2**, indicating that you would like to run another case, ABEL brings you back to the beginning of the program. If you type **3**, your ABEL session will end. When ABEL is done exiting the program, you will have the option of printing the output you designated in the Output Menu. The message reads:

> All of your output has been saved in a file.
>
> Do you want the output to be printed (Y = yes, N = no)?

If you type **Y** and you are working on a PC, ABEL will print your hard copy to the printer that is attached to your PC, and you will return to the operating system. If you type **Y** and you are working on a mainframe, you should follow the directions provided below. After following the printing procedures, or if you type **N**, you will be ready to log off of the mainframe. See the ABEL User's Guide for detailed instructions on this procedure. By using this Output Menu, you have saved your output in a file called OUTPUT.DAT. This file is over written each time you use the Output Menu to generate ABEL output. Thus, if you wish to save a file version of the output, you should rename OUTPUT.DAT after concluding the ABEL session.

3. Receiving a Printout from the Mainframe

If you are working on the mainframe, ABEL will ask for additional information at this time. If you are in Washington, D.C., ABEL will ask for your bin number:

```
        PLEASE SUPPLY THE FOLLOWING INFORMATION:
        ARE YOU WORKING AT A TERMINAL IN THE WASHINGTON D.C.          AREA?
        (Y=YES, N=NO)
Y

        ENTER YOUR BIN NUMBER
        (THE FORMAT SHOULD BE A LETTER D FOLLOWED BY
        THREE NUMBERS.  E.G., D099)
```

You can obtain a bin (and number) at the Washington Information Center (WIC) in the lower level of Waterside Mall. ABEL outputs will generally be delivered to your bin within half an hour. If you are outside Washington, ABEL will ask for your mailing box number:

```
        ENTER YOUR MAILING BOX NUMBER
        (THE FORMAT SHOULD BE YOUR USER IDENTIFICATION NUMBER
        PRECEDED BY THE LETTER M, e.g., MXXX.)
```

This number is your user identification number preceded by the letter M (e.g., MXXX). Your output will be mailed to the address recorded in your account information. Your output should arrive in three to five days.[31] ABEL then notifies you that your output will be printed and delivered or mailed:

> YOUR OUTPUT WILL BE PRINTED AT THE COMPUTER CENTER AND ROUTED TO YOUR BIN OR MAILED TO YOU.

4. Printing ABEL Output to a Local Printer

Another way to receive a printout of your ABEL results is to direct the output file to aa local printer. To do this, you should type **N** when asked "Do you want the output to be printed" as you do not want it printed on the mainframe. When you respond **N**, you will reach the "ready" prompt. At this point, there are several ways to print your output to a local printer. The name of the file you want to print is OUTPUT.DAT. Because the particular method used to print this file varies from region to region, it is not feasible to list all of the options in this document. Contact your local computer specialist for the most efficient way of printing this file.

[31] If you are using a TTY and already have a paper copy of the output, or if you have copied your session on a PC file through your communications software, you probably do not want to receive another copy. In this case you simply type **N** when ABEL asks if you want to receive a printed copy. ABEL will then proceed to logoff and will not ask additional questions.

The previous sections of this manual have provided numerous examples of ABEL output to demonstrate error messages, format of data entries, and output screens. This chapter of the ABEL User's Manual is devoted to going through a complete ABEL analysis from start to finish for a hypothetical firm. Most of ABEL's output options will be demonstrated through this analysis of a hypothetical firm. The case is based on three years of tax data taken from tax Form 1120 for 1988-1990 and organized on the ABEL Data Entry forms as shown in Exhibit 6-1.[32]

The complete ABEL session performed with the data from Exhibit 6-1 is shown in Exhibit 6-2.

[32] Blank copies of the ABEL data entry forms are provided in Appendix A.

Exhibit 6-1

ABEL DATA ENTRY FORM 6:
BACKGROUND INFORMATION FOR PHASE I ANALYSIS

ENTER THE FOLLOWING BACKGROUND INFORMATION ON YOUR CASE:

ITEM	INPUT
1. Name of Firm	**ABC Corporation**
2. Statute	**Clean Water Act - NPDES**
3. Number of Years of Data Available (1-5)	**3**
4. Most Recent Year Available (e.g., 1989)	**1990**

Note: For all of the Phase I and Phase II data inputs, make sure all entries have consistent units (e.g., thousands of dollars).

Exhibit 6-1
(continued)

ABEL DATA ENTRY FORM 3: 1989 AND 1990 FORM 1120

Fill in data year:

DATA ENTRY FORM FOR 1989 AND 1990 TAX FORM 1120	**1990**
1. Gross Receipts or Sales Less Returns and Allowances (Line 1c)	**170,000**
2. Interest Expense (Line 18)	**3,000**
3. Depreciation (Line 20)	**45,000**
4. Depletion (Line 22)	**0**
5. Taxable Income Before NOL and Special Deductions (Line 28)	**200,000**
6. NOL Deductions (Line 29a)	**0**
7. Special Deductions (Line 29b)	**0**
8. Total Tax (Line 31)	**80,000**
9. Credit from Regulated Investment Companies (Line 32f)	**0**
10. Credit for Federal Tax on Fuels (Line 32g)	**80,000**
11. Cash (Schedule L, Line 1)	**80,000**
12. Trade Notes and Accounts Receivable Less Allowance for Bad Debts (Schedule L, Line 2b)	**120,000**
13. Inventories (Schedule L, Line 3)	**300,000**
14. U.S. Government Obligations (Schedule L, Line 4)	**40,000**
15. Tax-Exempt Securities (Schedule L, Line 5)	**0**
16. Other Current Assets (Schedule L, Line 6)	**60,000**
17. Accounts Payable (Schedule L, Line 16)	**50,000**
18. Mortgages, Notes, Bonds Payable in Less Than One Year (Schedule L, Line 17)	**130,000**
19. Other Current Liabilities (Schedule L, Line 18)	**20,000**
20. Loans from Stockholders (Schedule L, Line 19)	**2,000**
21. Mortgages, Notes, Bonds Payable in One Year or More (Schedule L, Line 20)	**100,000**
22. Other Liabilities (Schedule L, Line 21)	**0**
23. Appropriated Retained Earnings (Schedule L, Line 24)	**0**
24. Unappropriated Retained Earnings (Schedule L, Line 25)	**780,000**
25. Total Liability and Stockholders' Equity (Schedule L, Line 27)	**1,200,000**
26. Income Recorded on Books not Included in Return (Schedule M-1, Line 7)	**0**

Note: All Form 1120, Schedule L, entries should be taken from column (d), the right-most column.

Exhibit 6-1
(continued)

ABEL DATA ENTRY FORM 3: 1989 AND 1990 FORM 1120

Fill in data year:

DATA ENTRY FORM FOR 1989 AND 1990 TAX FORM 1120	**1989**
1. Gross Receipts or Sales Less Returns and Allowances (Line 1c)	**130,000**
2. Interest Expense (Line 18)	**31,000**
3. Depreciation (Line 20)	**42,000**
4. Depletion (Line 22)	**0**
5. Taxable Income Before NOL and Special Deductions (Line 28)	**300,000**
6. NOL Deductions (Line 29a)	**0**
7. Special Deductions (Line 29b)	**0**
8. Total Tax (Line 31)	**120,000**
9. Credit from Regulated Investment Companies (Line 32f)	**0**
10. Credit for Federal Tax on Fuels (Line 32g)	**0**
11. Cash (Schedule L, Line 1)	**110,000**
12. Trade Notes and Accounts Receivable Less Allowance for Bad Debts (Schedule L, Line 2b)	**140,000**
13. Inventories (Schedule L, Line 3)	**270,000**
14. U.S. Government Obligations (Schedule L, Line 4)	**10,000**
15. Tax-Exempt Securities (Schedule L, Line 5)	**0**
16. Other Current Assets (Schedule L, Line 6)	**50,000**
17. Accounts Payable (Schedule L, Line 16)	**120,000**
18. Mortgages, Notes, Bonds Payable in Less Than One Year (Schedule L, Line 17)	**20,000**
19. Other Current Liabilities (Schedule L, Line 18)	**40,000**
20. Loans from Stockholders (Schedule L, Line 19)	**55,000**
21. Mortgages, Notes, Bonds Payable in One Year or More (Schedule L, Line 20)	**44,000**
22. Other Liabilities (Schedule L, Line 21)	**0**
23. Appropriated Retained Earnings (Schedule L, Line 24)	**0**
24. Unappropriated Retained Earnings (Schedule L, Line 25)	**770,000**
25. Total Liability and Stockholders' Equity (Schedule L, Line 27)	**1,150,000**
26. Income Recorded on Books not Included in Return (Schedule M-1, Line 7)	**0**

Note: All Form 1120, Schedule L, entries should be taken from column (d), the right-most column.

Exhibit 6-1
(continued)

ABEL DATA ENTRY FORM 2: 1988 FORM 1120

DATA ENTRY FORM FOR 1988 TAX FORM 1120	1988 VALUE
1. Gross Receipts or Sales Less Returns and Allowances (Line 1c)	**150,000**
2. Interest Expense (Line 18)	**30,000**
3. Depreciation (Line 20)	**40,000**
4. Depletion (Line 22)	**0**
5. Taxable Income Before NOL and Special Deductions (Line 28)	**400,000**
6. NOL Deductions (Line 29a)	**0**
7. Special Deductions (Line 29b)	**0**
8. Total Tax (Line 31)	**165,000**
9. Credit from Regulated Investment Companies (Line 32f)	**0**
10. Credit for Federal Tax on Fuels (Line 32g)	**5,000**
11. Cash (Schedule L, Line 1)	**20,000**
12. Trade Notes and Accounts Receivable Less Allowance for Bad Debts (Schedule L, Line 2a)	**280,000**
13. Inventories (Schedule L, Line 3)	**180,000**
14. U.S. Government Obligations (Schedule L, Line 4)	**20,000**
15. Tax-Exempt Securities (Not available on Form 1120 in 1988)	N/A
16. Other Current Assets (Schedule L, Line 5)	**60,000**
17. Accounts Payable (Schedule L, Line 15)	**110,000**
18. Mortgages, Notes, Bonds Payable in Less Than One Year (Schedule L, Line 16)	**0**
19. Other Current Liabilities (Schedule L, Line 17)	**80,000**
20. Loans from Stockholders (Schedule L, Line 18)	**0**
21. Mortgages, Notes, Bonds Payable in One Year or More (Schedule L, Line 19)	**80,000**
22. Other Liabilities (Schedule L, Line 20)	**0**
23. Appropriated Retained Earnings (Schedule L, Line 23)	**0**
24. Unappropriated Retained Earnings (Schedule L, Line 24)	**60,000**
25. Total Liability and Stockholders' Equity (Schedule L, Line 26)	**1,100,000**
26. Income Recorded on Books not Included in Return (Schedule M-1, Line 7)	**0**

Note: All Form 1120, Schedule L, entries should be taken from column (d), the right-most column.

Exhibit 6-1
(continued)

ABEL DATA ENTRY FORM 7:
KEY VALUES FOR PHASE II ANALYSIS

ENTER THE FOLLOWING DATA FOR PHASE II ANALYSIS:

ITEM	DOLLARS	YEAR
1. The year in which the company will be investing in pollution control equipment, incurring clean up costs and/or paying a penalty (e.g., 1991).	**Not Applicable**	**1991**
2. The proposed lump-sum settlement penalty (e.g., 100000). If there is no penalty, enter a zero.	**250,000**	**Not Applicable**
3. The depreciable cost of pollution control investment followed by year-end dollars (e.g., 60000 1989). The cost of land should not be included in this figure. Enter zero if this cost category is not applicable.	**50,000**	**1990**
4. The non-depreciable, non-tax-deductible one-time costs (e.g., the cost of land) followed by year-dollars (e.g., 150000 1989). Enter zero if this cost category is not applicable.	**0**	
5. The non-depreciable but tax-deductible one-time costs (e.g., site clean-up compliance costs) followed by year-dollars (e.g., 30000 1989). Enter zero of this cost category is not applicable.	**0**	
6. The annual costs of the pollution control activity (e.g., operating and maintenance costs) followed by year-dollars (e.g., 5000 1990). Enter zero if there are no annual costs.	**50,000**	**1990**

Exhibit 6-2

COMPLETE ABEL SESSION

```
 AAAAAA     BBBBBBB    EEEEEEE   L
A      A    B      B   E         L
AAAAAAAA    BBBBBBB    EEEEE     L
A      A    B      B   E         L
A      A    BBBBBBB    EEEEEEE   LLLLLLL

      Version 2.0.   July 1991

    Welcome to ABEL.  ABEL evaluates a firm's ability to pay pollution
    control expenditures, environmental clean-up costs, and/or a civil
    penalty. This version of ABEL was introduced in 1991.


Would you like an introduction (Y=yes,N=no)?
Y

INTRODUCTION TO ABEL:
---------------------
ABEL  performs  financial calc  ulations  designed to  measure  the  financial
health of a firm.  ABEL is designed to help answer the question:

   Based on the strength of the firm's projected future cash flows, what is
   the likelihood that the firm could finance a civil penalty, invest in
   pollution control equipment, or clean up a Superfund site?

The ability-to-pay calculations performed by ABEL are broken     into two phases.
In Phase I, you are asked to p  rovide general case information as well as one
to five years of tax data. ABEL accepts tax data directly fr    om tax forms 1120
and 1120-A. ABEL can also use other federal tax returns, suc    h as Form 1120-S,
Form 1065, and the sole proprietorship form (see Appendix C, ABEL User's
Manual).  You may want to use the ABEL Data Entry Sheets inc    luded in the ABEL
User's Manual to simplify the data entry process.  For each  year, you are
asked for 23 to 26 inputs, depending on the tax form you are using.


Press the carriage return (or enter key) for the next page of text.


INTRODUCTION TO ABEL (CONT.):
```

Phase II evaluates the firm's ability to pay pollution control costs or penalties. Phase II analysis requires at least three years of tax data. If you have not entered three years of data, you will be given an opportunity to do so. You will also be asked for the penalty and pollut ion control costs you wish to evaluate. ABEL contains a set of standard values used for the Phase II analysis. You are given the option of changing the standard values, although you should change them only if there is a c ompelling reason.

After entering your data, in e ither Phase I or Phase II, you can review your inputs before ABEL performs its financial calculations. After completing Phase II, you are given the opportunity to change some or all of the values you have provided, and to perform another Phase I and/or Pha se II calculation without leaving the program or losing your data.

Press the carriage return (or enter key) for the next page of text.

INTRODUCTION TO ABEL (CONT.):

At the conclusion of your session, ABEL will allow you to save your inputs for future use. Also ABEL can provide you with a printed copy of your data inputs and Phase I and Phase II results.

Explanations of the procedures and financial basis for ABEL is provided in the ABEL User's Manual. If you need additional information or need a copy of the Manual, call EPA Headquarters:

FTS-475-6777 or 202-475-6777

You can obtain help in entering any of the variables simply by typing the letter H after ABEL prompts you for the variable. After providing the Help explanation, ABEL will prompt you again for the same variable.

Press the carriage return (or enter key) for the next page of text.

INTRODUCTION TO ABEL (CONT.):

ABEL allows only certain data formats for numerical values and dates. Numerical values (costs, rates ,percentages, years) should be entered without commas, dollar signs, or perce nt signs. For example, enter a $10,000 cost as 10000 and enter 20% as 20. Us e decimals only for fractional values, such as 10000.50 dollars, or 20.1 percent. Be careful to use only number keys. A

```
common mistake is typing the lowercase letter L instead of the number 1.
Another error is typing the letter O instead of the number 0.

You should also make sure all   data are entered in consistent units, that is,
if you start entering data in thousands of dollars, e.g. $10    ,000,000 as 10000
you must use that convention throughout. ABEL will provide o    utput in the same
units you used for input.

You may leave the ABEL program without leaving the main computer system at
any point during the program by typing the letter Q at any p    rompt.  ABEL will
warn you that quitting the program will mean losing all work done in that
session, and will ask you if you are sure you want to quit.  Answering yes
will terminate the program immediately, and take you back to the main
computer system.

Press the carriage return (or enter key) to begin ABEL.


How will you enter data for the ABEL analysis?

    1.  Enter data during ABEL session.
    2.  Use a previously saved file.

Enter your selection (1 or 2):

1

**************************************************************************
    If you want to save your inputs at any time during the Phase I
    input, type "S".
**************************************************************************

ABEL will now ask you some background information on your case:


1A. Please enter the name of the firm to be analyzed (e.g., ABC Corp.)
ABC CORPORATION

 1B. Please identify the statute involved in your case. If your case
     involves more than one statute, please pick the most important one.

  1. Clean Air Act - Stationary source
  2. Clean Air Act - Mobile source
  3. Clean Water Act - 404
  4. Clean Water Act - NPDES
  5. FIFRA
  6. UST (Underground Storage Tank)
  7. RCRA (Other than UST)
  8. Safe Drinking Water Act - UIC
  9. Safe Drinking Water Act - PWS
 10. Superfund
 11. TSCA
 12. Other

Enter the number of the statute you have selected:
4
```

```
2. Please enter today's date (e.g. June 1, 1990):
JULY 31, 1991

3. Please Enter the Number of Years of Data Available
3

4. Please Enter the Most Recent Year
1990

Please enter the units that you are going to enter your data in:

    1. Dollars.
    2. Thousands of dollars.
    3. Millions of dollars.

**********************************************************************
     For example, if you choose "2", Thousands of dollars, you
     must enter all data inputs in thousands of dollars.  (e.g.
     $10,000 must be entered as "10".)
**********************************************************************
2


>>> Please enter data for 1990:

Which form are you using for year 1990?
1) ABEL Data Entry Form  2) Form 1120  3) Form 1120A
1

 1. Please enter Gross Receipts or Sales Less Returns & Allowances
(in Thousands)
170
3
 2. Please enter Interest Expense
(in Thousands)
2

 3. Please enter Depreciation
(in Thousands)
45

 4. Please enter Depletion
(in Thousands)
0

 5. Please enter Taxable Income Before Net Operating Loss
(in Thousands)
2000

 6. Please enter Net Operating Loss Deductions
(in Thousands)
B

 5. Please enter Taxable Income Before Net Operating Loss
(in Thousands)
  (Current Value =    2000.00, press ENTER to retain it)
```

```
200

 6. Please enter Net Operating Loss Deductions
(in Thousands)
  (Current Value =       0.00, press ENTER to retain it)
0

 7. Please enter Special Deductions
(in Thousands)
0

 8. Please enter Total Tax
(in Thousands)
8

 9. Please enter Credit from Regulated Investment Companies
(in Thousands)
0

10. Please enter Credit for Federal Tax on Fuels
(in Thousands)
80

11. Please enter Cash
(in Thousands)
80

12. Please enter Trade Notes & Accounts Receivable Less Bad Debts
(in Thousands)
120

13. Please enter Inventories
(in Thousands)
300

14. Please enter U.S. Government Obligations
(in Thousands)
40

15. Please enter Tax-Exempt Securities
(in Thousands)
0

16. Please enter Other Current Assets
(in Thousands)
60

17. Please enter Accounts Payable
(in Thousands)
50

18. Please enter Mortgages, Bonds Payable in Less Than One Year
(in Thousands)
130

19. Please enter Other Current Liabilities
```

```
(in Thousands)
20

20. Please enter Loans from Stockholders
(in Thousands)
20

21. Please enter Mortgages, Bonds Payable in One Year or More
(in Thousands)
B

20. Please enter Loans from Stockholders
(in Thousands)
  (Current Value =      20.00, press ENTER to retain it)
2

21. Please enter Mortgages, Bonds Payable in One Year or More
(in Thousands)
  (Current Value =       0.00, press ENTER to retain it)
100

22. Please enter Other Liabilities
(in Thousands)
0

23. Please enter Appropriated Retained Earnings
(in Thousands)
0

24. Please enter Unappropriated Retained Earnings
(in Thousands)
1200

25. Please enter Total Liability and Stockholders'Equity
(in Thousands)
B

24. Please enter Unappropriated Retained Earnings
(in Thousands)
  (Current Value =    1200.00, press ENTER to retain it)
780
25. Please enter Total Liability and Stockholders'Equity
(in Thousands)
  (Current Value =       0.00, press ENTER to retain it)
1200

26. Please enter Income Recorded on Books not Included in Return
(in Thousands)
0


>>> Please enter data for 1989:

Which form are you using for year 1989?
1) ABEL Data Entry Form  2) Form 1120  3) Form 1120A
1
```

```
 1. Please enter Gross Receipts or Sales Less Returns & Allowances
(in Thousands)
130

 2. Please enter Interest Expense
(in Thousands)
31

 3. Please enter Depreciation
(in Thousands)
42

 4. Please enter Depletion
(in Thousands)
0

 5. Please enter Taxable Income Before Net Operating Loss
(in Thousands)
300

 6. Please enter Net Operating Loss Deductions
(in Thousands)
0

 7. Please enter Special Deductions
(in Thousands)
0

 8. Please enter Total Tax
(in Thousands)
120

 9. Please enter Credit from Regulated Investment Companies
(in Thousands)
0

10. Please enter Credit for Federal Tax on Fuels
(in Thousands)
0

11. Please enter Cash
(in Thousands)
110

12. Please enter Trade Notes & Accounts Receivable Less Bad Debts
(in Thousands)
140

13. Please enter Inventories
(in Thousands)
270

14. Please enter U.S. Government Obligations
(in Thousands)
10
```

```
15. Please enter Tax-Exempt Securities
(in Thousands)
0

16. Please enter Other Current Assets
(in Thousands)
50

17. Please enter Accounts Payable
(in Thousands)
120

18. Please enter Mortgages, Bonds Payable in Less Than One Year
(in Thousands)
20

19. Please enter Other Current Liabilities
(in Thousands)
40

20. Please enter Loans from Stockholders
(in Thousands)
55

21. Please enter Mortgages, Bonds Payable in One Year or More
(in Thousands)
44

22. Please enter Other Liabilities
(in Thousands)
0

23. Please enter Appropriated Retained Earnings
(in Thousands)
0

24. Please enter Unappropriated Retained Earnings
(in Thousands)
770

25. Please enter Total Liability and Stockholders'Equity
(in Thousands)
1150

26. Please enter Income Recorded on Books not Included in Return
(in Thousands)
0


>>> Please enter data for 1988:

Which form are you using for year 1988?
1) ABEL Data Entry Form  2) Form 1120  3) Form 1120A
1
```

```
 1. Please enter Gross Receipts or Sales Less Returns & Allowances
(in Thousands)
150

 2. Please enter Interest Expense
(in Thousands)
30

 3. Please enter Depreciation
(in Thousands)
40

 4. Please enter Depletion
(in Thousands)
0

 5. Please enter Taxable Income Before Net Operating Loss
(in Thousands)
400

 6. Please enter Net Operating Loss Deductions
(in Thousands)
0

 7. Please enter Special Deductions
(in Thousands)
0

 8. Please enter Total Tax
(in Thousands)
165
 9. Please enter Credit from Regulated Investment Companies
(in Thousands)
0

10. Please enter Credit for Federal Tax on Fuels
(in Thousands)
5

11. Please enter Cash
(in Thousands)
20

12. Please enter Trade Notes & Accounts Receivable Less Bad Debts
(in Thousands)
280

13. Please enter Inventories
(in Thousands)
180

14. Please enter U.S. Government Obligations
(in Thousands)
20

15. Please enter Tax-Exempt Securities
```

(in Thousands)

16. Please enter Other Current Assets
(in Thousands)
60

17. Please enter Accounts Payable
(in Thousands)
110

18. Please enter Mortgages, Bonds Payable in Less Than One Year
(in Thousands)
0

19. Please enter Other Current Liabilities
(in Thousands)
80

20. Please enter Loans from Stockholders
(in Thousands)
0

21. Please enter Mortgages, Bonds Payable in One Year or More
(in Thousands)
80

22. Please enter Other Liabilities
(in Thousands)
0

23. Please enter Appropriated Retained Earnings
(in Thousands)
0

24. Please enter Unappropriated Retained Earnings
(in Thousands)
60

25. Please enter Total Liability and Stockholders'Equity
(in Thousands)
1100

26. Please enter Income Recorded on Books not Included in Return
(in Thousands)
0

You have entered Phase I data for 1990, 1989, 1988.
Which year of data would you like to review?
Select:
1. 1990
2. 1989
3. 1988

G. Go on to Phase I results

```
1


The following 1990 data have been entered (in Thousands):

 1. Gross Receipts or Sales Le  ss Returns & Allowances                 170.00
 2. Interest Expense                                                     32.00
 3. Depreciation                                                         45.00
 4. Depletion                                                             0.00
 5. Taxable Income Before Net   Operating Loss                         200.00
 6. Net Operating Loss Deducti  ons                                       0.00
 7. Special Deductions                                                    0.00
 8. Total Tax                                                             8.00
 9. Credit from Regulated Inve  stment Companies                          0.00

Enter the number of the value you wish to change (e.g. enter  1 to change
Gross Receipts or Sales Less Returns & Allowances ).
Enter G(o) to return to year-selecting screen.
Enter M(ore) to display more items for this year.
8

 8. Please enter Total Tax
(in Thousands)
  (Current Value =      8.00, press ENTER to retain it)
80

The following 1990 data have been entered (in Thousands):

 1. Gross Receipts or Sales Le  ss Returns & Allowances                 170.00
 2. Interest Expense                                                     32.00
 3. Depreciation                                                         45.00
 4. Depletion                                                             0.00
 5. Taxable Income Before Net   Operating Loss                         200.00
 6. Net Operating Loss Deducti  ons                                       0.00
 7. Special Deductions                                                    0.00
 8. Total Tax                                                            80.00
 9. Credit from Regulated Inve  stment Companies                          0.00

Enter the number of the value you wish to change (e.g. enter  1 to change
Gross Receipts or Sales Less Returns & Allowances ).
Enter G(o) to return to year-selecting screen.
Enter M(ore) to display more items for this year.
M

The following 1990 data have been entered (in Thousands):

10. Credit for Federal Tax on   Fuels                                    80.00
11. Cash                                                                 80.00
12. Trade Notes & Accounts Rec  eivable Less Bad Debts                  120.00
13. Inventories                                                         300.00
14. U.S. Government Obligation  s                                        40.00
15. Tax-Exempt Securities                                                 0.00
16. Other Current Assets                                                 60.00
17. Accounts Payable                                                     50.00
18. Mortgages, Bonds Payable i  n Less Than One Year                    130.00
```

```
Enter the number of the value you wish to change (e.g. enter 10 to change
Credit for Federal Tax on Fuels                    ).
Enter G(o) to return to year-selecting screen.
Enter M(ore) to display more items for this year.
Enter B(ack) to display previous screen.
G
Which year of data would you like to review?
      Select:
               1. 1990
               2. 1989
               3. 1988

               G. Go on to Phase I results
G

              ABEL is ready to begin Phase I output.

Please enter a carriage return to continue.

================================================================================

Firm's Name: ABC CORPORATION              Date: JULY 31, 1991

                           HISTORICAL FINANCIAL RATIOS

                         1990      1989      1988

Debt to Equity           0.34      0.32      0.33
Current Ratio            3.00      3.22      2.95
Times Int. Earned        7.25     10.68     14.33
Beaver's Ratio           0.81      0.80      1.04
Altman Z'-Score          2.78      3.13      2.93
================================================================================

Do you wish to see detailed explanations of these ratios?
(Y = Yes, N = No, go directly to Phase I conclusions)
Please enter choice:
Y
================================================================================

                         1990      1989      1988
Debt to Equity           0.34      0.32      0.33

    The debt to equity ratio (D/E) is defined as the firm's
    total liabilities divided by its stockholders' equity.
    This ratio measures the degree to which debt constitutes
    the company's financing.

    A D/E less than 1.5 but greater than or equal to zero generally
    indicates that a firm has additional debt capacity. This firm's
    D/E fell into this category in 1990, 1989, 1988.
================================================================================

Enter a carriage return to continue with individual ratio analysis.

================================================================================
```

```
                          1990      1989      1988
Current Ratio             3.00      3.22      2.95
```

The current ratio (CR) is defined as the firm's current assets divided by its current liabilities. The ratio assesses whether the firm will be able to cover its short-term debts using cash and other current assets which can be easily liquidated.

A CR greater than 2.0 generally indicates that a firm has good liquidity. This firm's CR was strong in 1990, 1989, 1988.

==========

Enter a carriage return to continue with individual ratio analysis.

==========

```
                          1990      1989      1988
Times Int. Earned         7.25     10.68     14.33
```

The times interest earned ratio (TIE) is defined as the firm's earnings before interest and taxes divided by its interest expense payments. This ratio indicates how easily the firm can pay the interest expense on its debt.

A TIE greater than 2.0 generally indicates that the firm is able to meet its interest payments. This firm fell into this category in 1990, 1989, 1988.

==========

Enter a carriage return to continue with individual ratio analysis.

==========

```
                          1990      1989      1988
Beaver's Ratio            0.81      0.80      1.04
```

Beaver's ratio (BR) is defined as the firm's after-tax cash flow divided by its total liabilitites. The BR provides a useful measure for predicting a firm's long-term solvency and likelihood of staying in business. In particular, the BR indicates whether the firm's internally generated cash flow is sufficient to meet its current and long-term financial obligations.

A BR greater than 0.20 generally indicates that the firm is solvent and healthy. This firm fell into this category in 1990, 1989, 1988.

==========

Enter a carriage return to continue with individual ratio analysis.

==========

```
                          1990      1989      1988
```

```
Altman Z'-Score          2.78      3.13      2.93

    Altman's Z'-Score (AZS) is calculated as a weighted average
    of several financial ratios.  AZS is a predictor  of  firm
    failure.  It is most accurate within  two years  prior  to
    bankruptcy.

    An AZS greater than 2.9 in  dicates that it is unlikely that the firm will
    be forced into bankruptcy during the coming two years. This
    firm's AZS fell into this category in 1989, 1988.

    An AZS betweeen 1.23 and 2.9 is inconclusive.  This
    situation applied to this firm in 1990.
==========================================================================
Enter a carriage return to see Phase I conclusions

==========================================================================

     This firm's most recent year's financial ratios indicate that
the firm's financial condition is fairly strong.  The firm will most
likely be able to obtain additional debt financing.


==========================================================================


                  * * * * * * * * * * * * * * * * *
         ABEL is now ready to proceed with the Phase II analysis.

         Please make sure to input all of your Phase II data in
         Thousands.


1. Enter the year in which the company will be investing in pollution
control equipment and/or paying a penalty (e.g., 1991).
1991

2. Enter the proposed lump-sum settlement penalty in Thousands.
If there is no proposed penalty, enter a zero.
250

3. Enter the depreciable capital cost of pollution control investment in
Thousands followed by year-dollars separated by a blank space (e.g.,
60000 1989).  The cost of land should not be included in this figure.
Enter zero if this cost category is not applicable.
50 1990

4. Enter the non-depreciable, non-tax-deductible capital costs associate    d
with the new investment in Thousands (e.g., the cost of land) followed by
year-dollars separated by a blank space (e.g., 15000 1990).  Enter zero if
this cost category is not applicable.
0

5. Enter the non-depreciable but tax-deductible capital cost    s associated with
the new investment in Thousands (e.g., site clean-up compliance costs)
followed by year-dollars separated by a blank space (e.g., 3    0000 1989). Enter
```

```
zero if this cost category is not applicable.
0

6. Enter the annual costs of the pollution control activity in Thousands
(e.g., operating and maintenance costs) followed by year-dollars separated
by a blank space (e.g., 30000 1989).  Enter zero if there are no annual
costs.
5 1991

  Would you like to review your penalty & pollution control cost inputs?
  (Y=yes, N=No)
Y

You have entered the following Phase II data (in Thousands):
                                                          Value  Year-
                                                                 dollars

1. Investment or penalty payment year                      1991
2. Lump-sum settlement penalty                              250.  1991
3. Depreciable capital cost                                  50.  1990
4. Non-depreciable, non-tax-deductible capital costs          0.  1991
5. Non-depreciable, tax-deductible one-time costs             0.  1991
6. Annual costs                                               5.  1991

Enter the number of the item whose value you want to change, or type G to
Go on with Phase II analysis.  For example, to change the value for the
Investment Year, type 1.

6

6. Enter the annual costs of the pollution control activity in Thousands
(e.g., operating and maintenance costs) followed by year-dollars separated
by a blank space (e.g., 30000 1989).  Enter zero if there are no annual
costs.
(Current values are      5.00 1991)
5 1990

You have entered the following Phase II data (in Thousands):
                                                          Value  Year-
                                                                 dollars

1. Investment or penalty payment year                      1991
2. Lump-sum settlement penalty                              250.  1991
3. Depreciable capital cost                                  50.  1990
4. Non-depreciable, non-tax-deductible capital costs          0.  1991
5. Non-depreciable, tax-deductible one-time costs             0.  1991
6. Annual costs                                               5.  1990

Enter the number of the item whose value you want to change, or type G to
Go on with Phase II analysis.  For example, to change the value for the
Investment Year, type 1.

G

ABEL uses the following standard values in Phase II:
```

```
1.      Reinvestment Rate                          =   0.0
2.      Marginal Income Tax Rate (%)               =  38.5
3.      Annual Inflation Rate (%)                  =   4.4
4.      Discount Rate (%)                          =  12.1
5.      Weighted Average Smoothing Constant        =   0.3

Do you wish to have any of these items explained? (Y=yes, N=no)
N

Do you wish to change any of these items? (Y=yes, N=no)
N


    ABEL can now analyze the ability of ABC CORPORATION
    to pay for pollution control expenditures and a penalty.


Enter a carriage return when you are ready for the ABEL SUMMARY ANALYSIS.


                              ABEL SUMMARY ANALYSIS
CASE: ABC CORPORATION         Date: JULY 31, 1991            Units: Thousands

                                        ABEL Cash Flow      ABEL Cash Flow
                    Total ABEL          Net of Pollution    Net of P.C.
Prob-                Cash Flow              Control         Expenditures
ability             Generated           Expenditures        & Penalty
  (1)                   (2)                  (3)                (4)

 50%                  1141.                1087.               837.
 60%                  1099.                1045.               795.
 70%                  1051.                 998.               748.
 80%                   987.                 934.               684.
 90%                   867.                 814.               564.
 95%                   644.                 591.               341.
 99%                     0.                   0.                 0.

 ABEL projects that there is a 96.0% probability that ABC CORPORATION
 can finance a penalty of $       250, a total initial pollution control
 investment of $        52, and annual pollution control expenses of
 $         5 through the funds the company generates over the next five
 years.  All figures are expressed in Thousands and 1991 year-dollars.

Press return to continue with Phase II analysis

Would you like an explanation of any of the information in the ABEL SUMMARY
ANALYSIS? (Y=yes, N=no)
N


What further Phase II analysis would you like?

         1. Calculate the annual penalty amount for a penalty which
             is to be spread over more than one year.
         2. ABEL's evaluation of historical cash flows.
         3. A more detailed version of the ABEL SUMMARY ANALYSIS.
```

```
         4. Modify Phase II input values.
         5. None of the above.  Proceed to ABEL Output Menu.
1
==========================================================================

   Rather than paying a single lump-sum penalty at the beginning of 1991
   ABC CORPORATION    could spread payment of that penalty o    ver several years
   in equal installments.  The first installment would occur in 1991
   and the remaining installments would occur at the same time in each of
   the following years.
==========================================================================

Over how many years would you like to spread the penalty?
(Select an integer value greater than 1 and less than or equal to 5.)
5
==========================================================================

 A lump-sum settlement penalty of $         250000. (expressed in 1991
 dollars) is exactly equal to 5 years of annual payments of     $          62020.
==========================================================================


What further Phase II analysis would you like?

         1. Calculate the annual penalty amount for a penalty which
             is to be spread over more than one year.
         2. ABEL's evaluation of historical cash flows.
         3. A more detailed version of the ABEL SUMMARY ANALYSIS.
         4. Modify Phase II input values.
         5. None of the above.  Proceed to ABEL Output Menu.
2

ABEL is ready to present an analysis of historic cash flows for
ABC CORPORATION     .  Enter a carriage return when you are ready.

==========================================================================

                     ABEL's HISTORICAL CASH FLOWS ANALYSIS
CASE: ABC CORPORATION       Date: JULY 31, 1991           Units: Thousands

                                                  Inflation-Adjusted
       Year          Pre-tax Cash Flow            Pre-tax Cash Flow

       1990                 325.                       339.
       1989                 342.                       373.
       1988                 445.                       506.
==========================================================================

Would you like an explanation of ABEL'S HISTORICAL CASH FLOW ANALYSIS?
(Y=yes, N=no)
N


What further Phase II analysis would you like?

         1. Calculate the annual penalty amount for a penalty which
```

is to be spread over more than one year.
2. ABEL's evaluation of historical cash flows.
3. A more detailed version of the ABEL SUMMARY ANALYSIS.
4. Modify Phase II input values.
5. None of the above. Proceed to ABEL Output Menu.

3

Following is a more detailed version of the ABEL SUMMARY ANALYSIS. Enter a carriage return when you are ready.

DETAILED ABEL SUMMARY ANALYSIS

CASE: ABC CORPORATION Date: JULY 31, 1991 Units: Thousands

Prob-ability	Total ABEL Cash Flow Generated	Initial Pollution Control Cash Flow	Annual Pollution Control Cash Flow	ABEL Cash Flow Net of Pollution Control Expenditures
50%	1141.	40.	14.	1087.
60%	1099.	40.	14.	1045.
70%	1051.	40.	14.	998.
80%	987.	40.	14.	934.
90%	867.	40.	14.	814.
95%	644.	40.	14.	591.
99%	0.	40.	14.	0.

Press enter to continue with the DETAILED ABEL SUMMARY ANALYSIS

Which column of the DETAILED ABEL SUMMARY ANALYSIS would you like explained in more detail?

1. Probability
2. Total ABEL Cash Flow (C.F.) Generated
3. Initial Pollution Control C.F.
4. Annual Pollution Control C.F.
5. ABEL C.F. Net of P.C. Expenditures
6. None. I want to proceed with the Phase II analysis.

6

What further Phase II analysis would you like?

1. Calculate the annual penalty amount for a penalty which is to be spread over more than one year.
2. ABEL's evaluation of historical cash flows.
3. A more detailed version of the ABEL SUMMARY ANALYSIS.
4. Modify Phase II input values.
5. None of the above. Proceed to ABEL Output Menu.

5

ABEL Output Menu:

```
  Select the data inputs and ABEL results you want saved in a file for
  printing from the following:

    1. Phase I and Phase II Inputs.  Entire Phase I and Phase II Results.
    2. Phase I and Phase II Inputs.  Phase I and Phase II Summary Results.
    3. Phase I Inputs.  Entire Phase I Results.
    4. Phase II Inputs.  Entire Phase II Results.
    5. None.  Proceed with the program.
1
... Generating Phase I and Phase II outputs ...

    You have now generated a file that contains your output.
    After concluding this ABEL session, you will be given the
    option of receiving a hard copy of this output.


How would you like to proceed   with your ABEL analysis of ABC CORPORATION   ?

         1. Modify Phase I input values.
         2. Clear data inputs; evaluate a different case.
         3. Conclude this ABEL session.
3

Do you want to save your inputs (Y=yes,N=no)?
Y

Please enter the name of the file in which you would like to save your
inputs.  Enter a carriage return to cancel.
ABCCORP.ABL

Do you want to save your inputs (Y=yes,N=no)?
Y

Please enter the name of the file in which you would like to save your
inputs.  Enter a carriage return to cancel.
ABCCORP.ABL


ALL OF YOUR OUTPUT HAS BEEN SAVED IN A FILE.
DO YOU WISH TO RECEIVE A PRINTED COPY OF THIS OUTPUT?
(Y=YES, N=NO)
N

READY
```

Appendix A

ABEL DATA ENTRY FORMS

ABEL DATA ENTRY FORMS

ABEL is constructed to allow you to enter data from tax form 1120, tax form 1120-A, or the ABEL data entry forms. Some users may find it easier to organize the necessary data on the data entry forms before running the ABEL program, as the data forms are arranged in the same order as the inputs in the ABEL model.

In this appendix, we provide the necessary information for converting tax form data to the data entry forms. Because the tax forms are not the same from 1984 to 1990, it was necessary to generate five different data entry forms, three for use with form 1120 and two for use with form 1120-A. The forms are attached as follows:

- **Exhibit A-1**: ABEL Data Entry Form 1, for use with tax form 1120, 1984-1987;
- **Exhibit A-2**: ABEL Data Entry Form 2, for use with tax form 1120, 1988;
- **Exhibit A-3**: ABEL Data Entry Form 3, for use with tax form 1120, 1989 and 1990;
- **Exhibit A-4**: ABEL Data Entry Form 4, for use with tax form 1120-A, 1984-1988; and
- **Exhibit A-5**: ABEL Data Entry Form 5, for use with tax form 1120-A, 1989 and 1990.

In addition to these data entry forms, two additional forms have bee n included in this appendix. These forms list the background informatio n needed to run Phase I and key additional inputs to run Phase II:

- **Exhibit A-6**: ABEL Data Entry Form 6, for background informatio n used in Phase I analysis; and

- **Exhibit A-7**: ABEL Data Entry Form 7, for key inputs needed t o complete Phase II analysis.

Exhibit A-1

ABEL DATA ENTRY FORM 1: 1984-1987 FORM 1120

Fill in data year:

DATA ENTRY FORM FOR 1984-1987 TAX FORM 1120	
1. Gross Receipts or Sales Less Returns and Allowances (Line 1c)	
2. Interest Expense (Line 18)	
3. Depreciation (Line 20)	
4. Depletion (Line 22)	
5. Taxable Income Before NOL and Special Deductions (Line 28)	
6. NOL Deductions (Line 29a)	
7. Special Deductions (Line 29b)	
8. Total Tax (Line 31)	
9. Credit from Regulated Investment Companies (Line 32e)	
10. Credit for Federal Tax on Fuels (Line 32f)	
11. Cash (Schedule L, Line 1)	
12. Trade Notes and Accounts Receivable Less Allowance for Bad Debts (Schedule L, Line 2a)	
13. Inventories (Schedule L, Line 3)	
14. U.S. Government Obligations (Schedule L, Line 4)	
15. Tax-Exempt Securities (Not available on Form 1120 in 1987-84)	N/A
16. Other Current Assets (Schedule L, Line 5)	
17. Accounts Payable (Schedule L, Line 15)	
18. Mortgages, Notes, Bonds Payable in Less Than One Year (Schedule L, Line 16)	
19. Other Current Liabilities (Schedule L, Line 17)	
20. Loans from Stockholders (Schedule L, Line 18)	
21. Mortgages, Notes, Bonds Payable in One Year or More (Schedule L, Line 19)	
22. Other Liabilities (Schedule L, Line 20)	
23. Appropriated Retained Earnings (Schedule L, Line 23)	
24. Unappropriated Retained Earnings (Schedule L, Line 24)	
25. Total Liability and Stockholders' Equity (Schedule L, Line 26)	
26. Income Recorded on Books not Included in Return (Schedule M-1, Line 7)	

Note: All Form 1120, Schedule L, entries should be taken from column (d), the right-most column.

Exhibit A-2

ABEL DATA ENTRY FORM 2: 1988 FORM 1120

DATA ENTRY FORM FOR 1988 TAX FORM 1120	1988 VALUE
1. Gross Receipts or Sales Less Returns and Allowances (Line 1c)	
2. Interest Expense (Line 18)	
3. Depreciation (Line 20)	
4. Depletion (Line 22)	
5. Taxable Income Before NOL and Special Deductions (Line 28)	
6. NOL Deductions (Line 29a)	
7. Special Deductions (Line 29b)	
8. Total Tax (Line 31)	
9. Credit from Regulated Investment Companies (Line 32f)	
10. Credit for Federal Tax on Fuels (Line 32g)	
11. Cash (Schedule L, Line 1)	
12. Trade Notes and Accounts Receivable Less Allowance for Bad Debts (Schedule L, Line 2a)	
13. Inventories (Schedule L, Line 3)	
14. U.S. Government Obligations (Schedule L, Line 4)	
15. Tax-Exempt Securities (Not available on Form 1120 in 1988)	N/A
16. Other Current Assets (Schedule L, Line 5)	
17. Accounts Payable (Schedule L, Line 15)	
18. Mortgages, Notes, Bonds Payable in Less Than One Year (Schedule L, Line 16)	
19. Other Current Liabilities (Schedule L, Line 17)	
20. Loans from Stockholders (Schedule L, Line 18)	
21. Mortgages, Notes, Bonds Payable in One Year or More (Schedule L, Line 19)	
22. Other Liabilities (Schedule L, Line 20)	
23. Appropriated Retained Earnings (Schedule L, Line 23)	
24. Unappropriated Retained Earnings (Schedule L, Line 24)	
25. Total Liability and Stockholders' Equity (Schedule L, Line 26)	
26. Income Recorded on Books not Included in Return (Schedule M-1, Line 7)	

Note: All Form 1120, Schedule L, entries should be taken from column (d), the right-most column.

Exhibit A-3

ABEL DATA ENTRY FORM 3: 1989 AND 1990 FORM 1120

Fill in data year:

DATA ENTRY FORM FOR 1989 AND 1990 TAX FORM 1120	
1. Gross Receipts or Sales Less Returns and Allowances (Line 1c)	
2. Interest Expense (Line 18)	
3. Depreciation (Line 20)	
4. Depletion (Line 22)	
5. Taxable Income Before NOL and Special Deductions (Line 28)	
6. NOL Deductions (Line 29a)	
7. Special Deductions (Line 29b)	
8. Total Tax (Line 31)	
9. Credit from Regulated Investment Companies (Line 32f)	
10. Credit for Federal Tax on Fuels (Line 32g)	
11. Cash (Schedule L, Line 1)	
12. Trade Notes and Accounts Receivable Less Allowance for Bad Debts (Schedule L, Line 2b)	
13. Inventories (Schedule L, Line 3)	
14. U.S. Government Obligations (Schedule L, Line 4)	
15. Tax-Exempt Securities (Schedule L, Line 5)	
16. Other Current Assets (Schedule L, Line 6)	
17. Accounts Payable (Schedule L, Line 16)	
18. Mortgages, Notes, Bonds Payable in Less Than One Year (Schedule L, Line 17)	
19. Other Current Liabilities (Schedule L, Line 18)	
20. Loans from Stockholders (Schedule L, Line 19)	
21. Mortgages, Notes, Bonds Payable in One Year or More (Schedule L, Line 20)	
22. Other Liabilities (Schedule L, Line 21)	
23. Appropriated Retained Earnings (Schedule L, Line 24)	
24. Unappropriated Retained Earnings (Schedule L, Line 25)	
25. Total Liability and Stockholders' Equity (Schedule L, Line 27)	
26. Income Recorded on Books not Included in Return (Schedule M-1, Line 7)	

Note: All Form 1120, Schedule L, entries should be taken from column (d), the right-most column.

Exhibit A-4

ABEL DATA ENTRY FORM 4: 1984-1988 FORM 1120-A

Fill in data year:

DATA ENTRY FORM FOR 1984-1988 TAX FORM 1120-A	
1. Gross Receipts or Sales Less Returns and Allowances (Line 1c)	
2. Interest Expense (Line 18)	
3. Depreciation (Line 20)	
4. Depletion (not available on Form 1120-A)	N/A
5. Taxable Income Before NOL and Special Deductions (Line 24)	
6. NOL Deductions (Line 25a)	
7. Special Deductions (Line 25b)	
8. Total Tax (Line 27)	
9. Credit from Regulated Investment Companies (Line 28f)	
10. Credit for Federal Tax on Fuels (Line 28g)	
11. Cash (Part II, Line 1)	
12. Trade Notes and Accounts Receivable Less Allowance for Bad Debts (Part II, Line 2 minus Part II, Line 2a)	
13. Inventories (Part II, Line 3)	
14. U.S. Government Obligations (Part II, Line 4)	
15. Tax-Exempt Securities (not available on 1988 Form 1120-A)	N/A
16. Other Current Assets (Part II, Line 5)	
17. Accounts Payable (Part II, Line 12)	
18. Mortgages, Notes, Bonds Payable in Less Than One Year (not available on Form 1120-A)	N/A
19. Other Current Liabilities (Part II, Line 13)	
20. Loans from Stockholders (Part II, Line 14)	
21. Mortgages, Notes, Bonds Payable in One Year or More (Part II, Line 15)	
22. Other Liabilities (Part II, Line 16)	
23. Appropriated Retained Earnings (not available on Form 1120-A)	N/A
24. Unappropriated Retained Earnings (Part II, Line 19)	
25. Total Liability and Stockholders' Equity (Part II, Line 21)	
26. Income Recorded on Books not Included in Return (Part III, Line 5)	

Note: All Form 1120-A Part II entries should be taken from column (b), the right-most column.

Exhibit A-5

ABEL DATA ENTRY FORM 5: 1989 AND 1990 FORM 1120-A

Fill in data year:

DATA ENTRY FORM FOR 1989 AND 1990 TAX FORM 1120-A	
1. Gross Receipts or Sales Less Returns and Allowances (Line 1c)	
2. Interest Expense (Line 18)	
3. Depreciation (Line 20)	
4. Depletion (not available on Form 1120-A)	N/A
5. Taxable Income Before NOL and Special Deductions (Line 24)	
6. NOL Deductions (Line 25a)	
7. Special Deductions (Line 25b)	
8. Total Tax (Line 27)	
9. Credit from Regulated Investment Companies (Line 28f)	
10. Credit for Federal Tax on Fuels (Line 28g)	
11. Cash (Part II, Line 1)	
12. Trade Notes and Accounts Receivable Less Allowance for Bad Debts (Part II, Line 2a minus Part II, Line 2b)	
13. Inventories (Part II, Line 3)	
14. U.S. Government Obligations (Part II, Line 4)	
15. Tax-Exempt Securities (Part II, Line 5)	
16. Other Current Assets (Part II, Line 6)	
17. Accounts Payable (Part II, Line 13)	
18. Mortgages, Notes, Bonds Payable in Less Than One Year (not available on Form 1120-A)	N/A
19. Other Current Liabilities (Part II, Line 14)	
20. Loans from Stockholders (Part II, Line 15)	
21. Mortgages, Notes, Bonds Payable in One Year or More (Part II, Line 16)	
22. Other Liabilities (Part II, Line 17)	
23. Appropriated Retained Earnings (not available on Form 1120-A)	N/A
24. Unappropriated Retained Earnings (Part II, Line 20)	
25. Total Liability and Stockholders' Equity (Part II, Line 22)	
26. Income Recorded on Books not Included in Return (Part III, Line 5)	

Note: All Form 1120-A Part II entries should be taken from column (b), the right-most column.

Exhibit A-6

ABEL DATA ENTRY FORM 6:
BACKGROUND INFORMATION FOR PHASE I ANALYSIS

ENTER THE FOLLOWING BACKGROUND INFORMATION ON YOUR CASE:

ITEM	INPUT
1. Name of Firm	
2. Statute	
3. Number of Years of Data Available (1-5)	
4. Most Recent Year Available (e.g., 1989)	

Note: For all of the Phase I and Phase II data inputs, make sure all entries have consistent units (e.g., thousands of dollars).

Exhibit A-7

ABEL DATA ENTRY FORM 7:
KEY VALUES FOR PHASE II ANALYSIS

ENTER THE FOLLOWING DATA FOR PHASE II ANALYSIS:

ITEM	DOLLARS	YEAR
1. The year in which the company will be investing in pollution control equipment, incurring clean up costs and/or paying a penalty (e.g., 1991).	Not Applicable	
2. The proposed lump-sum settlement penalty (e.g., 100000). If there is no penalty, enter a zero.		Not Applicable
3. The depreciable cost of pollution control investment followed by year-end dollars (e.g., 60000 1989). The cost of land should not be included in this figure. Enter zero if this cost category is not applicable.		
4. The non-depreciable, non-tax-deductible one-time costs (e.g., the cost of land) followed by year-dollars (e.g., 150000 1989). Enter zero if this cost category is not applicable.		
5. The non-depreciable but tax-deductible one-time costs (e.g., site clean-up compliance costs) followed by year-dollars (e.g., 30000 1989). Enter zero of this cost category is not applicable.		
6. The annual costs of the pollution control activity (e.g., operating and maintenance costs) followed by year-dollars (e.g., 5000 1990). Enter zero if there are no annual costs.		

Appendix B

TECHNICAL APPENDIX

PHASE I FINANCIAL RATIO CALCULATIONS

PHASE II ABILITY TO PAY CALCULATIONS

A. PHASE I FINANCIAL RATIO CALCULATIONS

1. Overview

The first section of this appendix presents the methodology used by ABEL to calculate the five Phase I financial ratios. Exhibit B-1 contains a list of these names and the associated line numbers from Form 1120 (1990) and Form 1120-A (1990). All Phase I variables have the same names here as are used in the actual ABEL computer code. The primary purpose of this appendix is to aid users and financial analysts who seek detailed information regarding ABEL's financial ratio calculations. Exhibit B-2 shows the variables derived by the computer program from the entered values.

2. Debt to Equity Ratio

Formulas[33]:

$$DE = \frac{TOTLIB}{EQUITY}$$ where

EQUITY = ASSETS - TOTLIB and

TOTLIB = ACTPAY + CDET + OCL + LST + LTD + OLIB.

Notes:

If ASSETS = TOTLIB, then ABEL prints "*****", indicating that the ratio cannot be computed. A Debt to Equity ratio of "*****" indicates that stockholders' equity is zero, an extremely serious financial condition.

[33] All data for Phase I calculations come from the same year. This is different from the Phase II calculations, described in Section II of Appendix B, which references data from different years.

EXHIBIT B-1

ABEL TAX-FORM INPUT VARIABLE NAMES AND TAX FORM LINE NUMBERS

Input Variable	Variable Definition	1990 Form 1120 Line #	1990 Form 1120-A Line #	Notes
ACTPAY	Accounts payable	L-16	II-13	
ACTREC	Accounts receivable less allowance for bad debts	L-2B	II-2A minus II-2B	User to perform subtraction.
ASSETS	Total liabilities & stockholders' equity	L-27	II-22	
BNC	Income recorded on books but not on return	M-1:7	III-5	
CASH	Cash	L-1	II-1	
CDET	Mortgages, notes, bonds payable < 1 year	L-17	None	
CRFUL	Credit for Federal tax on fuels	32g	28g	
CRREG	Credit from regulated investment companies	32f	28f	
DEPL	Depletion deduction	22	None	
DEPR	Depreciation deduction	20	20	
FED	Government obligations	L-4	II-4	
INTR	Interest expense deduction	18	18	
INV	Inventories	L-3	II-3	
LST	Loans from stockholders	L-19	II-15	
LTD	Mortgages, notes, bonds payable > 1 year	L-20	II-16	
NETSALES	Gross sales less returns and allowances	1c	1c	
OCL	Other current liabilities	L-18	II-14	
OCR	Other current assets	L-6	II-6	
OLIB	Other liabilities	L-21	II-17	
REAPP	Appropriated retained earnings	L-24	None	
REUNAPP	Unappropriated retained earnings	L-25	II-20	
TAX	Total taxes	31	27	
TESEC	Tax-exempt securities	L-5	II-5	
TIBNOL	Taxable income before NOL & special deductions	28	24	
NOL	Net operating loss deduction	29A	25A	Used for Phase II
SPDED	Special deductions	29B	25B	Used for Phase II

Notes:

1. All form 1120 Schedule L entries should be taken from column (d), the right-most column. All form 1120-A Part II entries should be taken from column (b), the right-most column.

2. "L-6" refers to line 6 of Schedule L of form 1120.

3. "II-1" refers to line 1 of Part II of form 1120-A.

4. "M-1:7" refers to line 7 of Schedule M-1.

EXHIBIT B-2

ABEL PHASE I DERIVED VARIABLE NAMES

Derived Variable	Variable Definition	Used In
AZS	Altman's Z-Score	AZS
BR	Beaver Ratio	Beaver's ratio
CASHAT	After-tax cash flow	Beaver's ratio
CR	Current ratio	Current ratio
CURAS	Total current assets	Current ratio, AZS
CURLIB	Total current liabilities	Current ratio, AZS
DE	Debt-equity ratio	DE ratio
EBIT	Earnings before interest and taxes	TIE ratio, AZS
EQUITY	Stockholders' equity	DE ratio, AZS
RETEARN	Total retained earnings	AZS
TIE	Times interest earned ratio	TIE ratio
TOTLIB	Total liabilities	DE ratio, AZS, BR
WC	Working capital	AZS

3. Current Ratio

Formulas:

$$CR = \frac{CURAS}{CURLIB} \quad \text{where}$$

CURAS = CASH + ACTREC + INV + FED + TESEC + OCR and

CURLIB = ACTPAY + CDET + OCL

Notes:

If CURAS >= 0 and CURLIB = 0, then the current ratio will be assigned a value of "*****" for that year. The value of CURAS will determine the category into which that year's current ratio will be classified in ABEL's detailed explanations of the historic financial ratios:

- Those years for which CURAS = 0 and CURLIB = 0 will be classified as having a Current Ratio between 1.0 and 2.0.
- Those years for which CURAS > 0 and CURLIB = 0 will be classified as having a Current Ratio greater than 2.0.

4. Times Interest Earned Ratio

Formulas:

$$TIE = \frac{EBIT}{INTR} \quad \text{where}$$

EBIT = INTR + TIBNOL

Notes:

A value of "*****" will be assigned to the Times Interest Earned ratio for those years in which INTR = 0. A TIE of "*****" indicates that the firm had no interest expense in that year.

5. Beaver's Ratio

Formulas:

$$BR = \frac{CASHAT}{TOTLIB} \quad \text{where}$$

CASHAT = TIBNOL - TAX + CRREG + CRFUL + DEPR + DEPL + BNC

Notes:

The above equation for after-tax cash flow (CASHAT) does not, strictly speaking, include all items that affect cash flow. Not included are changes in non-cash working capital, capital expenditures paid for with cash, dividends, and cash flow resulting from debt and equity financing. The above definition of cash flow was chosen for calculating Beaver's Ratio (BR) because it most closely replicates the definition used by William Beaver in his famous study (i.e., after-tax net income + depreciation + depletion).[34] Also, Beaver's definition was used as the basis for determining healthy/unhealthy BR cutoff values.[35]

If TOTLIB = 0, Beaver's ratio will be assigned a value of "*****" for that year. A BR of "*****" indicates that the firm had no liabilities in that year. Because this situation is extremely unusual, ABEL will recommend that the user check that year's tax return data against all Phase I inputs before proceeding.

6. Altman's Z-Score[36]

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[34] William H. Beaver, "Financial Ratios as Predictors of Failure", in Empirical Research in Accounting: Selected Studies, 1966, pages 71-111.

[35] Note that the above equation for cash flow is quite sound without requiring an excessive number of ABEL inputs. Phase II of ABEL utilizes an identical definition of cash flow except that it also takes into account reinvestment in equipment (i.e., capital expenditures). Thus, Phase II's implicit cash flow assumptions are that net non-cash working capital is at a steady-state level, there are no dividends (or if there are, they can be discontinued in order to finance capital expenditures or to pay penalties), and that the only sustainable cash flows are those from operations rather than from debt or equity financing.

[36] Edward I. Altman, Corporate Financial Distress: A Complete Guide to Predicting, Avoiding and Dealing with Bankruptcy, 1983, and "The Success of Business Failure Prediction Models", Journal of Banking and Finance, Vol. 8, pages 171-198, June 1984.

Formulas:

$$AZS = (0.717 * Z_1) + (0.847 * Z_2) + (3.107 * Z_3) + (0.420 * Z_4) + (0.998 * Z_5$$

$$Z_1 = \frac{CURAS - CURLIB}{ASSETS}$$

$$Z_2 = \frac{REAPP + REUNAPP}{ASSETS}$$

$$Z_3 = \frac{EBIT}{ASSETS}$$

$$Z_4 = \frac{EQUITY}{TOTLIB}$$

$$Z_5 = \frac{NETSALES}{ASSETS}$$

Notes:

If ASSETS = 0 or TOTLIB = 0, ABEL will assign that year's Altman's Z-Score (AZS) a value of "*****." An AZS of "*****" indicates that a numerical value could not be computed for that year because either total assets or total liabilities were equal to zero. Because these situations are extremely unusual, ABEL will recommend that the user check the actual tax return against all Phase I data inputs for that year before proceeding.

B. PHASE II CALCULATIONS

1. Overview

This section presents ABEL's Phase II ability to pay calculations. ABEL discounts future years' projected internally generated cash flows back to the date on which the firm will incur the environmental expenditure. All after-tax cash flows associated with the pollution control activity and penalty are subtracted out of these cash flows to estimate the funds that will remain after these expenditures. If the present value of these net cash flows is greater than or equal to zero, the firm is deemed able to pay for both the pollution control expenditures and the penalty. If the present value is negative, however, the firm is deemed unable to fund the expenditures and/or penalty.

While the technique of discounting cash flows is well accepted by the financial community, the actual implementation in this context is quite complex. To begin, there are seven main steps involved in the Phase II ability to pay calculations:

1. Calculate the firm's pre-tax historic available cash flows;

2. Adjust the historic available cash flows for inflation;

3. Compute the mean and standard deviation of the historic inflation-adjusted pre-tax available cash flows;

4. Estimate the firm's future available pre-tax cash flows;

5. Compute the present value of five years of the firm's future available after-tax cash flows;

6. Compute the present value of five years of the after-tax cash flows associated with the new (pollution control and penalty) expenditures; and

7. Compute the resulting net present value of all cash flows and adjust it for the penalty payment.

2. Detailed Ability to Pay Calculations

As in Section A of this appendix, the variable names used in the following equations are the same ones used in the ABEL computer code. Exhibit B-3 provides definitions of all Phase II variables, which are entered by the user (Input Variables). Exhibit B-4 defines all variables that have values calculated by the program (Derived Variables). The following subscripts apply to all of the variables used in the equations listed below:

1. Subscript "j" indicates that the variable takes on a different value in each year. Subscript "j" is only used for historic data, with the most recent year's data corresponding to j=1 and the least recent year's data corresponding to either j=3, 4, or 5, depending on the number of years of historic data that were entered by the user.

2. Subscript "k" is used for the value of variables in future years, with k=1 corresponding to the first future year and k=5 corresponding to the fifth future year. The beginning of the first future year (the whole year of which is represented by k=1) corresponds to the time that the company invests in pollution control equipment as well as the point in time to which all future cash flows are discounted.

3. Subscript "prob" indicates that the variable takes on a different value for each of seven different probability levels.

Step 1: Calculate Pre-Tax Historic Available Cash Flow

The historic pre-tax available cash flow, $XNCASH_j$, is calculated as:

$$XNCASH_j = CASHAT_j + TAX_j - [FTR2 * DEPR_j]$$

where the reinvestment rate, FTR2, is assigned a standard value of 0.0 unless modified by the user in the Phase II input section. Like the provided historical data, these calculations yield available cash flow figures expressed in current (nominal) dollar terms.

Step 2: Adjust Available Cash Flows for Inflation

ABEL next converts the current dollar pre-tax historic available cash flows into inflation-adjusted constant (real) dollars as of the base year (the year that the company will be making the environmental expenditure and/or paying the penalty). This year is represented by the input variable ITODAY. The equation is:

$$XCASH_j = XNCASH_j * [(1 + XINF)^{(ITODAY - MRY + j - 1)}]$$

where "j" in the exponent takes on the same values as the subscripts j. For this equation to correctly convert current dollars into constant dollars, it is essential that all historic data are for consecutive years.

The annual inflation rate, XINF, is assigned a standard value unless modified by the user in the Phase II input section.

EXHIBIT B-3

ABEL PHASE II INPUT VARIABLES

Input Variable	Variable Definition
ANN	Annual pollution control costs expressed in ANN$
ANN$	The year-dollars of ANN
BNC_j	Income recorded on books but not on return
CLEAN	Nondepreciable but deductible one-time costs expressed in CLEAN$
CLEAN$	The year-dollars of CLEAN
COMPANY_NAME	Name of the company being analyzed
$CRFUL_j$	Credit for Federal tax on fuels (Phase I input)
$CRREG_j$	Credit from regulated investment companies (Phase I input)
CURRENT_DATE	Date on which the user is performing the ABEL analysis
$DEPL_j$	Depletion deduction (Phase I input)
$DEPR_j$	Depreciation deduction (Phase I input)
EQUIP	Depreciable capital cost of new investment in EQUIP$
EQUIP$	The year-dollars of EQUIP
FTR2	Reinvestment rate (Standard Value = 0.0)
ITODAY	Year to which net present value and constant dollar calculations are made; same as penalty payment/investment year
LAND	Nondepreciable, nondeductible one-time costs in LAND$
LAND$	The year-dollars of LAND
MRY	Most recent year for which there are input data (from Phase I)
NOL_{MRY}	Net operating loss deduction (from Phase I) for most recent year of data
NUMYRS	Number of years for which there are data (from Phase I)
PENAL	Civil penalty expressed in ITODAY dollars
SMOOTH	Smoothing constant used in weighted average (Standard Value = 0.3)
$SPDED_j$	Special deductions (from Phase I)

EXHIBIT B-3

(continued)

ABEL PHASE II INPUT VARIABLES

Input Variable	**Variable Definition**
TAX_j	Total Tax (Phase I input)
$TIBNOL_j$	Taxable income before NOL & special deductions (from Phase I)
TXRT	Total marginal tax rate (Standard Value = 0.385)
XINF	Annual inflation rate (Standard Value = .044)
YRS	Number of years over which the penalty payment will be spread

EXHIBIT B-4

ABEL PHASE II DERIVED VARIABLES

Derived Variable	Variable Definition
EQUIV	Annual equivalent cash flow of CIVIL
$ATFCF_{prob,k}$	After-tax future available cash flow in ITODAY dollars
AVCSH	Weighted-average value of $XCASH_j$
CAPCST	Depreciable capital cost of new investment in ITODAY dollars
CAPND	Nondepreciable, nondeductible cost of new investment in ITODAY dollars
CARFOR	NOL carryforward expressed in ITODAY dollars
$CASH\$_j$	$PTCASH_j$ expressed in ITODAY constant dollars
$CASHAT_j$	After-tax cash flow (Calculated in Phase I for Beaver's ratio)
CASHAV	Simple average of $CASH\$_j$, excluding most recent year
$CHARGE_{prob}$	PV of 5 years of $ATFCF_{prob,k}$
$EXPWT_j$	Weights used to calculate weighted average of historical cash flows
INC_j	Pre-tax, pre-NOL-deduction income in ITODAY dollars
INCAV	Weighted average of INC_j
$MACRS_k$	Percentage of CAPCST to be depreciated in year k
NOLIF	Number of years until NOL carryforward expended
NOLRD	NOLIF rounded to the nearest integer
NSD_{prob}	Number of standard deviations away from mean for probability prob
ONM	ANN expressed in ITODAY dollars
$PBCSH_{prob}$ probability prob	Future pre-tax cash flow that will be equalled or exceeded with
$PBINC_{prob}$	Future pre-tax pre-NOL-deduction income that will be equalled or exceeded with probability prob
PENPRB	Probability of being able to afford the penalty amount
$PTCASH_j$	Pre-tax, pre-reinvestment cash flow

EXHIBIT B-4

(continued)

ABEL PHASE II DERIVED VARIABLES

Derived Variable	**Variable Definition**
PVCAP	Present value of initial capital investment
PVONM	After-tax present value of annual costs
PVTS	Present value of 5 years of TS_k
SDCSH	Standard deviation of $XCASH_j$
SDINC	Standard deviation of INC_j
SMSUM	Scaling factor for weighted average
$TAXES_{prob,k}$	Taxes the company will pay in year k at probability prob
TS_k	Total tax shield for new investment in year k
TXND	Nondepreciable but deductible cost of new investment in ITODAY dollars
VARCSH	Variance of $XCASH_j$
$XCASH_j$	Constant dollar "available" pre-tax cash flow
$XNCASH_j$	Current dollar "available" pre-tax cash flow
$XNET_{prob}$	Present value as of ITODAY of all cash flows
XNRATE	Nominal discount rate for the firm's cash flows

Notes:

1. Subscript "j" indicates that the variable takes on a different value each year. It is only used for historic data. j = 1 corresponds to the most recent year for which there are data.

2. Subscript "k" also indicates that the variable takes on a different value each year, but it is only used to refer to future years. k = 1 corresponds to the first future year, the year in which the company invests in new pollution control equipment (same date as ITODAY).

3. Subscript "prob" indicates that the variable's value changes with the probability level, of which there are seven.

Step 3: Compute Mean and Standard Deviation of Historic Constant Dollar Pre-Tax Available Cash Flows

The equation for the weighted average of the constant dollar historic pre-tax available cash flows, AVCSH, is:

$$AVCSH = \sum_{j=1}^{NUMYRS} (XCASH_j * EXPWT_j) \quad \text{where}$$

$$EXPWT_j = \frac{SMOOTH * (1 - SMOOTH)^{j-1}}{SMSUM}$$

$$\text{and} \quad SMSUM = \sum_{j=1}^{NUMYRS} [SMOOTH * (1 - SMOOTH)^{(j-1)}]$$

The variance and standard deviation of the historic constant dollar pre-tax available cash flows are computed using the following equations:

$$SDCSH = VARCSH^{0.5} \quad \text{where}$$

$$VARCSH = \sum_{j=1}^{NUMYRS} \frac{(XCASH_j - AVCSH)^2 * EXPWT_j * NUMYRS}{NUMYRS - 1}$$

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Step 4: Estimate Future Available Pre-Tax Cash Flows

This equation calculates the constant dollar available cash flows that a firm can be expected to generate in the future at different probability levels. We assume that the firm's total population of all of its historic constant dollar available cash flows are normally distributed.

ABEL employs the T-distribution as the basis for estimating probabilities, because of the small number of data points used in the calculations. In general, if a population is normally distributed, then one can estimate the percentage of data points in the population that will exceed a particular value by using a standard normal table. Even if we are only dealing with a subset of the entire population, we can still use the standard normal table to estimate percentages (probabilities), providing the sample is large enough, typically in excess of fifteen to thirty data points. When the population is normally distributed but the sample size is very small, the T-distribution table is the analytically correct approach for estimating probabilities. The T-distribution, also referred to as the sampling distribution, has the same symmetrical bell-shaped curve as the normal distribution. It is somewhat flatter and lower at the mean, however, as well as somewhat higher in the two tails than the normal distribution.

The calculation of the future expected pre-tax cash flow, at each probability level, is calculated as follows:

$$PBCSH_{prob} = AVCSH - (SDCSH * NSD_{prob})$$

In this equation, the value of NSD_{prob} is taken from the "look-up" table shown in Exhibit B-5. These T-distribution values can be found in any statistics book; two books are listed in Exhibit B-5 for reference purposes.

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Exhibit B-5

VALUE OF NSD_{prob}

	Number of Years of Historic Data		
Probability	**3**	**4**	**5**
50%	0.000	0.000	0.000
60%	0.289	0.277	0.271
70%	0.617	0.584	0.569
80%	1.061	0.978	0.941
90%	1.886	1.638	1.533
95%	2.920	2.353	2.132
99%	6.965	4.541	3.747

Sources:

1. E. Mansfield, Statistics for Business and Economics, Third Edition, W.W. Norton & Co., 1987, p. A16.

2. Pindyck & Rubinfeld, Econometric Models & Economic Forecasts, Second Edition, McGraw-Hill, 1981, p. 608.

For example, the equation for the minimum pre-tax cash flow that we could expect to obtain 80% of the time, using five years of data, is:

$$PBCSH_{80\%} = AVCSH - (SDCSH * 0.941)$$

Step 5: Compute Present Value of Future Available After-Tax Cash Flows

The present value of five years of expected future available after-tax cash flows for a given probability level, designated as $CHARGE_{prob}$, is calculated from the following equation:

$$CHARGE_{prob} = \sum_{k=1}^{5} ATFCF_{prob,k} * \left[\frac{1 + XINF}{1 + XNRATE}\right]^{k-0.5}$$ where

$$ATFCF_{prob,k} = PBCSH_{prob} - TAXES_{prob,k}$$

In this equation $ATFCF_{prob,k}$ represents the after-tax future available cash flow for year "k" and probability level "prob". The value of this variable corresponds to constant ITODAY dollars, as can be seen from Steps 2-4 above.

A number of comments are necessary to clarify the previous set of equations:

- In the equation for $CHARGE_{prob}$, first we inflate $ATFCF_{prob,k}$ to nominal year "k" dollars and then we discount that cash flow back to ITODAY using the firm's nominal discount rate. The calculation is made in this manner because finance theory dictates that nominal cash flows be discounted at the nominal discount rate and real cash flows be discounted at the real interest rate.
- The exponent in the equation for $CHARGE_{prob}$ uses half-years since the company's annual cash flows are assumed to occur in the middle of each year. This convention balances off cash flows which occur in the first half of the year with those that occur in the second half of the year.
- XNRATE, the weighted average cost of capital, is an after-tax discount rate and is applied to after-tax cash flows.

$TAXES_{prob,k}$ are calculated as follows. This calculation is complex since we must estimate the number of years before the most recent year's Net Operating Loss (NOL) carryforward is expended, and calculate the amount of income on which taxes are based for the seven different probability levels.

a. Calculate historic pre-tax pre-NOL-deduction income in ITODAY dollars:

$$INC_j = (TIBNOL_j - SPDED_j) * (1 + XINF)^{(ITODAY - MRY + j - 1)}$$

b. Calculate the historic weighted average of pre-tax pre-NOL-deduction income in ITODAY dollars, denoted by INCAV:

$$INCAV = \sum_{j=1}^{NUMYRS} (INC_j * EXPWT_j)$$

c. Calculate the standard deviation of historic pre-tax pre-NOL-deduction income in nominal ITODAY dollars:

$$SDINC = \left[\sum_{j=1}^{NUMYRS} \frac{(INC_j - INCAV)^2 * EXPWT_j * NUMYRS}{NUMYRS - 1} \right]^{.5}$$

d. Calculate the future expected pre-tax pre-NOL-deduction income which will be equalled or exceeded with a given probability, $PBINC_{prob}$:

$$PBINC_{prob} = INCAV - (SDINC * NSD_{prob})$$

where the value of NSD_{prob} is taken from the "look-up" table presented in Exhibit B-5.

e. Calculate the NOL carryforward, as of the end of the most recent year of historic data, expressed in ITODAY dollars:

CARFOR = Minimum of 0 or

$(TIBNOL_{MRY} - NOL_{MRY} - SPDED_{MRY}) * (1 + XINF)^{(ITODAY - MRY)}$

Note that the NOL carryforward is expressed as a negative number.

f. Calculate the number of years after the most recent year of historic data until the NOL carryforward will be completely expended:

$$NOLIF = \frac{-CARFOR}{INCAV}$$ where

NOLRD = NOLIF rounded up/down to the nearest integer. Note that if NOLIF is exactly 0, then NOLRD would also be exactly 0.

g. Use the decision rules shown in Exhibit B-6 to determine $TAXES_{prob,k}$.

Exhibit B-6

DECISION RULES FOR CALCULATING FUTURE YEARS' TAXES

CARFOR	$PBINC_{prob}$	Decision Rule
= 0	> 0	Calculate $TAXES_{prob,k} = TXRT * PBINC_{prob}$ for all k.[37]
= 0	<= 0	$TAXES_{prob,k} = 0$ for all k[38]
< 0	<= 0	$TAXES_{prob,k} = 0$ for all k[39]
< 0	> 0	The company will begin paying taxes after its NOL carryforward has been expended. a. If (k - 1 + ITODAY - MRY) <= NOLRD, then $TAXES_{prob,k}=0$. b. If (k - 1 + ITODAY - MRY) > NOLRD, then $TAXES_{prob,k} = TXRT * PBINC_{prob}$.

The tax rates are based on marginal corporate tax rates taken from the Tax Reform Act of 1986 and on 1989 state marginal tax rates taken from the 1990 - 1991 edition of The Book of the States.[40]

[37] The company has no NOL carryforward and a positive taxable income at this probability level, so must pay taxes in all years.

[38] The company has no NOL carryforward but has negative taxable income at this probability level. The company will not pay any taxes and will build up a NOL carryforward.

[39] The company has a NOL carryforward and negative taxable income at this probability level. The company will not pay any taxes and its NOL carryforward will grow in size.

[40] The inclusion of state taxes and use of the highest federal marginal tax rate results in a conservative estimate of taxes for small firms with income less than $75,000.

Step 6: Compute Present Value of After-Tax Cash Flows Associated with New Capital Investment

There are three primary components to a new pollution control capital investment that affect after-tax cash flow: the original capital investment, the depreciation and deduction tax shields associated with the investment (corresponding to EQUIP and CLEAN, respectively), and the annual operating expenses. The equation for the present value of five years of after-tax cash flows for each of these is developed below.

a. Calculate the present value of the initial capital investment, denoted by PVCAP, as of the beginning of ITODAY

PVCAP = -CAPCST - CAPND - TXND

The initial capital investment consists of a single cash outflow at the beginning of ITODAY, and consists of three parts:

CAPCST is the constant dollar depreciable capital cost of the new pollution control investment.

CAPND is constant dollar nondepreciable, non-tax-deductible one-time costs of the new investment.

TXND is the constant dollar nondepreciable but tax deductible capital one-time costs.

Since the above capital cost cash flows all occur at the beginning of year ITODAY, there is no need to discount them; they already represent present values. To obtain the constant ITODAY-dollar capital costs, however, we need to adjust the user-entered capital costs:

$$CAPCST = EQUIP * (1 + XINF)^{(ITODAY - EQUIP\$)}$$

where EQUIP is the user-provided CAPCST expressed in year EQUIP$ dollars.

$$CAPND = LAND * (1 + XINF)^{(ITODAY - LAND\$)}$$

where LAND is the user-provided CAPND expressed in year LAND$ dollars.

$$TXND = CLEAN * (1 + XINF)^{(ITODAY - CLEAN\$)}$$

where CLEAN is the user-provided TXND expressed in year CLEAN$ dollars.

b. Calculate the present value of the tax shields, PVTS, associated with the initial capital investment, as of ITODAY

There are two sources of tax shields corresponding to the initial pollution control capital investment, both of which serve to reduce taxes and thereby increase cash flow. The two sources are the depreciation tax shields associated with CAPCST and the nondepreciable but tax deductible items, represented by TXND, that are written off for tax purposes in year ITODAY.

In order to be consistent with the Tax Reform Act of 1986 and the July 1990 version of BEN, CAPCST will be depreciated under the Modified Accelerated Cost Recovery System (MACRS). MACRS calls for the use of double declining balance (DDB) depreciation with half-year convention, a seven year life, and a switch from

DDB to the straight line method in the fifth year. The switch is made in the year depreciation equals or exceeds that determined under DDB in order to maximize the depreciation deduction.

The total depreciation and deduction tax shield for the year in which the investment is made (i.e., k=1) is:

$$TS_{k=1} = TXRT * [(CAPCST * .14286) + TXND]$$

where the value of .14286 is taken from a MACRS depreciation schedule.[41]

For years k=2 to 5, the total tax shield consists solely of the depreciation tax shield and is given by the formula:

$$TS_k = TXRT * CAPCST * MACRS_k$$

where $MACRS_k$ is taken from the following table:[42]

k	$MACRS_k$
2	0.24490
3	0.17493
4	0.12495
5	0.08925

[41] For example, refer to p. 307 of the 1990 U.S. Master Tax Guide.

[42] Ibid.

The present value as of ITODAY of five years of the tax shields associated with the initial capial investment is given by:

$$PVTS = \sum_{k=1}^{5} \frac{TS_k}{(1 + XNRATE)^{k-0.5}}$$

Note that it is not appropriate to inflate the tax shields to current dollars before discounting them since the actual depreciation in any year is a fixed dollar amount, and is thus already in each year's current dollars. Also, we use the weighted average cost of capital as the discount rate since it incorporates the firm's overall risk level. Finally, the exponent in the equation for PVTS uses half-years since tax shields increase cash flow and the company's annual cash flors are assumed to occur in the middle of each year, as discussed previously.

c. Calculate the present value of the after-tax annual cash flows, PVONM, as of ITODAY

$$PVONM = -ONM * (1 - TXRT) * \sum_{k=1}^{5} \left[\frac{1 + XINF}{1 + XNRATE} \right]^{k-0.5}$$

where ONM represents the annual expense (ANN), expressed in ITODAY dollars.

The value provided by the user for this expense must, however, first be converted into ITODAY dollars:

$$ONM = ANN * (1 + XINF)^{(ITODAY - ANN\$)}$$

where ONM is the user-provided ANN expressed in year ITODAY dollars.

The above equation for the present value of annual expenses assumes that these expenses escalate at the inflation rate and that they occur in the middle of the year. The weighted average cost of capital is again used as the discount rate.

Step 7: Compute Resulting Net Present Value of Five Years of After-Tax Future Cash Flows for All Probability Levels

$$XNET_{prob} = CHARGE_{prob} + PVONM + PVTS + PVCAP$$

where $XNET_{prob}$ represents the present value, as of the beginning of ITODAY, of five years of net after-tax cash flows available to the firm for discretionary uses.

Note that this does not mean that the firm will have enough cash on hand as of ITODAY to make a lump sum penalty payment equal to $XNET_{prob}$. If the firm's current financial position is strong, however, as determined in Phase I, and XNET is sufficiently large with, say an 80% confidence level, then ABEL assumes that the firm would be able to obtain additional debt or equity financing sufficient to pay a lump sum penalty of that amount.

Step 8: Convert the Penalty into an Annual Equivalent Cash Flow

Rather than paying a single lump-sum penalty at the beginning of ITODAY, the government may wish to allow a company to spread payment of that penalty over several years in equal installments. The first installment would occur during ITODAY and the remaining installments would occur at the same time during each of the following years.

If this option is chosen in the output section, the user will be asked for the number of years over which to spread the penalty payment (YRS) at that time. The annual installment amount is:

$$EQUIV = \frac{CIVIL}{1 + \sum_{k=1}^{YRS-1} \frac{1}{(1 + XNRATE)^k}}$$

where CIVIL is the penalty input as PENAL in ITODAY dollars.

Note that this annual installment is already expressed in current dollar terms since the equation was derived by discounting nominal cash flows at the firm's nominal interest rate. It also assumes that the initial payment is paid as of ITODAY.

Step 9: Calculate the Probability Level Associated with the Penalty Amount Using Linear Interpolation

ABEL will have previously computed the values in the right hand column of the following table:

Probability	Value
50%	$\mathbf{XNET_{prob=50\%}}$
60%	$\mathbf{XNET_{prob=60\%}}$
70%	$\mathbf{XNET_{prob=70\%}}$
80%	$\mathbf{XNET_{prob=80\%}}$
90%	$\mathbf{XNET_{prob=90\%}}$
95%	$\mathbf{XNET_{prob=95\%}}$
99%	$\mathbf{XNET_{prob=99\%}}$

A computer algorithm calculates the probability level associated with a given penalty amount, as follows:

1. Determine the two consecutive values in the right column of the above table between which **CIVIL** falls.

2. Perform a linear interpolation to determine the probability level associated with **CIVIL**. Assign that probability level as a string to the variable **PENPRB**.[43]

3. If the numerical value of **PENPRB** < 60%, then set **PENPRB** equal to the string "less than 50".

4. If the numerical value of **PENPRB** > 99%, then set **PENPRB** equal to the string "99+".

[43] For example, if $\mathbf{XNET}_{\mathbf{prob=80\%}}$ = 100, $\mathbf{XNET}_{\mathbf{prob=90\%}}$ = 70, and **CIVIL** = 80, then **PENPRB** = 90 - (90 - 80) * [(80 - 70) ÷ (100 - 70)] = 86.7 86.7 would then be converted to the string "86.7".

Appendix C

USING ALTERNATIVE FEDERAL TAX FORMS

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USING ALTERNATIVE FEDERAL TAX FORMS

To this point in the manual, all of ABEL's income statement and balance sheet data requirements have been taken from a firm's corporate tax returns, either Form 1120 or 1120-A. ABEL is sufficiently flexible, however, to utilize other federal tax returns, such as Form 1120-S, Form 1065, and the sole proprietorship form. The use of these forms in ABEL is discussed below. Additional information on evaluating non-corporate entities is contained in the ABEL User's Guide. If ABEL indicates an inability to pay, you should pursue further analysis of the entity and its owners.

A. Inputing Data from Form 1120-S and Form 1065

1. General Information

Both Phase I and Phase II of ABEL can be run with federal tax return Forms 1120-S and 1065. These forms correspond to S-corporations and partnerships, respectively.[44] Exhibits C-1 and C-2 provide the line numbers on the tax forms that correspond to the necessary ABEL inputs for these two tax forms, respectively. Note that because the tax forms change from year to year, you must be careful to match the appropriate line number to the appropriate year of the form.

You should pay special attention to the directions in Exhibit C-2 when using Form 1065. In some instances a partnership filing Form 1065 may have rental income from properties it owns. In certain years rental income and expenses are shown in a separate section of the tax form (Schedule H), and are not included in the "Ordinary income (loss) from trade or business activity(ies)".[45] You should be sure to include all rental income

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[44] One of the characteristics of a corporation is that the owners' liability for corporate debts are limited to corporate property. S-corporations differ from regular corporations (i.e. "C-corporations" which file tax Form 1120 or 1120-A) in that the S-corporation passes all expenses and income on through to the owners. The owners then report the expenses and income on their personal income taxes. In contrast, a C-corporation pays income tax and the owners also pay income tax on any income received from the corporation (e.g. dividends, or salary). A partnership is similar to a S-corporation except that the owners are liable for any debts of the partnership. A "general partner" can be personally liable, while limited partners' exposure is limited to their investment.

[45] In addition, all income and expenses resulting from rental properties are usually detailed in schedules attached to the tax return.

and expenses when evaluating the partnership's ability to pay. Exhibit C-2 provides guidance on how to include these figures.

2. The Calculation of Total Taxes

One problem that you will encounter in using either of these tax forms involves the calculation of taxes paid by the organization. In fact, both S-corporations and partnerships pass income and expenses through to the owners, who then pay taxes on the net income from all of their business activities. There are two issues related to taxes: (1) the amount of tax the organization has historically paid; and (2) the marginal tax rate to apply to ABEL's projection of future cash flows.

As indicated in Exhibit C-1 and C-2, we recommend you use zero for total tax (data item #8). This may overestimate historical cash flows, if the owner is paying substantial taxes. On the other hand, frequently owners pay little or no taxes due to the nature of their taxable income and expenses.

To calculate after-tax cash flows in Phase II, it is necessary to specify the marginal tax rate. The current default value in ABEL is 38.5%, which reflects the federal and state marginal rates for corporations. For the purposes of an S-corporation or a partnership, we recommend you use the individual marginal federal rate at the upper end of the income scale as the default value. In 1991, the highest marginal rate is 31 percent. Alternatively, you could determine the appropriate marginal rate by using the net taxable income of a typical shareholder in the S-corporation or the typical partner in the partnership.

B. Sole Proprietorship

Sole proprietors provide information on business income and expenses on Schedule C of Form 1040. Unlike C-corporations, S-corporations or partnerships, however, sole proprietors are not required to supply any information on the assets and liabilities (the "balance sheet") of the business. Therefore, ABEL cannot calculate any financial ratios, because of the lack of balance sheet information.

ABEL can estimate historical cash flows generated by the business, make a projection of future cash flows, and then predict the business's ability to support penalty payment or pollution control investment. Exhibit C-3 provides the line numbers corresponding to the ABEL inputs for the Sole Proprietorship form. As for partnerships and S-corporations, you should use a marginal tax rate equity to the marginal rate paid by the sole proprietor (the highest rate in 1991 was 31 percent).

The user should take special care in evaluating sole proprietorships, however, especially when ABEL shows that the business cannot afford to pay. In particular, the sole proprietor's non-business income and assets are also available to pay for a penalty or pollution control costs. At the same time, you should be aware that the income tax form does not list all of an individual's minimum expenses (rent, debt payments, etc.). In short, if the business cannot support a penalty payment, you should request additional information on the proprietor's living expenses, assets and liabilities. Additional information on evaluating a sole proprietorship can be found in the ABEL User's Guide.

Note that ABEL should only be run on active sole proprietorships. If the business is no longer operating, then you must assume it can not pay a penalty. The individual's financial situation must then be evaluated.

Exhibit C-1

DATA LOCATIONS ON FORM 1120S

	Data Item	Location on Form 1120 S (S Corporation)
1.	Gross Receipts or Sales Less Returns and Allowances	1990: Sum of 1c, K-3a, and total gross rental income from Form 8825, line 17 1987-1989: Sum of 1c, K-2a and K-3a 1984-1986: Sum of 1c, 5 and 6
2.	Interest Expense	1990: Sum of 13, interest expense from schedule for K-3b, and from Form 8825, sum of line 9 for all properties 1987-1989: Sum of 13, interest expense from schedule for K-2b and K-3b 1984-1986: 16a
3.	Depreciation	1990: L-10b -- Col.(c) minus Col.(a)[1] 1989: L-10a -- Col.(c) minus Col.(a) 1984-1988: L-9a -- Col.(c) minus Col.(a)
4.	Depletion and Amortization	1990: L-11b -- Col.(c) minus Col.(a); plus L-13b -- Col.(c) minus Col.(a)[2] 1989: L-11a -- Col.(c) minus Col.(a); plus L-13a -- Col.(c) minus Col.(a) 1984-1988: L-10a -- Col.(c) minus Col.(a); plus L-12a -- Col.(c) minus Col.(a)
5.	Taxable Income Before NOL and Special Deductions	1990: K-20 1987-1989: Sum of K-1, K-2c, K-3c, K-4a to K-4f, K-5 and K-6; minus sum of K-7 to K-10 1984-1986: Sum of K-1a-d, K-2 to K-6; minus sum of K-7 to K-10
6.	NOL Deductions	NA., use 0
7.	Special Deductions	NA., use 0
8.	Total Tax	1987-1990: 22c 1984-1986: 25c

	Data Item	Location on Form 1120 S (S Corporation)
9.	Credit From Regulated Investment Companies	NA., use 0
10.	Credit For Federal Tax on Fuels	1990: 23c 1987-1989: 23b 1984-1986: 26b
11.	Cash	L-1, Col.(d)
12.	Trade Notes and Accounts Rec. Less Allowance for Bad Debts	1990: L-2b, Col.(d) 1984-1989: L-2a, Col.(d)
13.	Inventories	L-3, Col.(d)
14.	U.S. Government Obligations	L-4, Col.(d)
15.	Tax-Exempt Securities	1989-1990: L-5, Col.(d) 1984-1988: NA., use 0
16.	Other Current Assets	1989-1990: L-6, Col.(d) 1984-1988: L-5, Col.(d)
17.	Accounts Payable	1989-1990: L-16, Col.(d) 1984-1988: L-15, Col.(d)
18.	Mortgages, Notes, Bonds Payable in Less Than One Year	1989-1990: L-17, Col.(d) 1984-1988: L-16, Col.(d)
19.	Other Current Liabilities	1989-1990: L-18, Col.(d) 1984-1988: L-17, Col.(d)
20.	Loans From Stockholders	1989-1990: L-19, Col.(d) 1984-1988: L-18, Col.(d)
21.	Mortgages, Notes, Bonds Payable in One Year or More	1989-1990: L-20, Col.(d) 1984-1988: L-19, Col.(d)
22.	Other Liabilities	1989-1990: L-21, Col.(d) 1984-1988: L-20, Col.(d)
23.	Appropriated Retained Earnings	1990: L-24, Col.(d) 1989: Sum of L-28 and L-29, Col.(d) 1986-1988: Sum of L-27 and L-28, Col.(d) 1984-1985: L-23, Col.(d)
24.	Unappropriated Retained Earnings	1986-1990: NA., use 0 1984-1985: L-24, Col.(d)

	Data Item	Location on Form 1120 S (S Corporation)
25.	Total Liability and Stockholder's Equity	1990: L-26, Col.(d) 1989: L-30, Col.(d) 1984-1988: L-29, Col.(d)
26.	Income Recorded on Books not Included in Return	1990: M-1, line 5 1984-1989: NA., use 0

[1] Note that this is a short-cut method that, in some situations, may slightly understate total depreciation deducted.

[2] Note that this is a short-cut method that, in some situations, may slightly understate total depletion and amortization taken.

Exhibit C-2

DATA LOCATIONS ON FORM 1065

	Data Item	Location on Form 1065 (Partnership)	
1.	Gross Receipts or Sales Less Returns and Allowances	1990:	Sum of 1c, gross income from schedule for 4 and 5, and total gross rental income from Form 8825, line 17[1]
		1987-1989:	Sum of 1c, gross income from schedule for 4 and 5, and sum of H-2 for all properties
		1984-1986:	Sum of 1c, 6c and gross income from schedule for 4, 7 and 8
2.	Interest Expense	1990:	Sum of 12, interest expense from schedule for 4 and 5, and from Form 8825, sum of line 9 for all properties[2]
		1987-1989:	Sum of 12, interest expense from schedule for 4 and 5, and sum of H-9 for all properties
		1984-1986:	Sum of 15a, interest expense from schedules for 4, 6, 7 and 8
3.	Depreciation	1990:	L-9b -- Col.(c) minus Col.(a)[3]
		1989:	L-8b -- Col.(c) minus Col.(a)
		1984-1988:	L-8a -- Col.(c) minus Col.(a)
4.	Depletion and Amortization	1990:	L-10b -- Col.(c) minus Col.(a); plus L-12b -- Col.(c) minus Col.(a)[4]
		1989:	L-9b -- Col.(c) minus Col.(a); plus L-11b -- Col.(c) minus Col.(a)
		1984-1988:	L-9a -- Col.(c) minus Col.(a); plus L-11a -- Col.(c) minus Col.(a)
5.	Taxable Income Before NOL and Special Deductions	1990:	K-20a
		1988-1989:	K-19a
		1987:	M(c)
		1984-1986:	24
6.	NOL Deductions	NA., use 0	

	Data Item	Location on Form 1065 (Partnership)
7.	Special Deductions	NA., use 0
8.	Total Tax	NA., use 0
9.	Credit From Regulated Investment Companies	NA., use 0
10.	Credit For Federal Tax on Fuels	NA., use 0
11.	Cash	L-1, Col.(d)
12.	Trade Notes and Accounts Rec. Less Allowance for Bad Debts	1990: L-2b, Col.(d) 1984-1989: L-2a, Col.(d)
13.	Inventories	L-3, Col.(d)
14.	U.S. Government Obligations	1990: L-4, Col.(d) 1989: L-4a, Col.(d) 1984-1988: L-4, Col. (d)
15.	Tax-Exempt Securities	1990: L-5, Col.(d) 1989: L-4b, Col.(d) 1984-1988: NA., use 0
16.	Other Current Assets	1990: L-6, Col.(d) 1984-1989: L-5, Col.(d)
17.	Accounts Payable	1990: L-15, Col.(d) 1984-1989: L-14, Col.(d)
18.	Mortgages, Notes, Bonds Payable in Less Than One Year	1990: L-16, Col.(d) 1984-1989: L-15, Col.(d)
19.	Other Current Liabilities	1990: L-17, Col.(d) 1984-1989: L-16, Col.(d)
20.	Loans From Stockholders	1990: L-18, Col.(d) 1984-1989: L-17, Col.(d)
21.	Mortgages, Notes, Bonds Payable in One Year or More	1990: L-19, Col.(d) 1984-1989: L-18, Col.(d)
22.	Other Liabilities	1990: L-20, Col.(d) 1984-1989: L-19, Col.(d)
23.	Appropriated Retained Earnings	1990: L-21, Col.(d) 1984-1989: L-20, Col.(d)

	Data Item	Location on Form 1065 (Partnership)
24.	Unappropriated Retained Earnings	NA., use 0
25.	Total Liability and Stockholder's Equity	1990: L-22, Col.(d) 1984-1989: L-21, Col.(d)
26.	Income Recorded on Books not Included in Return	NA., use 0

[1] Identify and sum all income from business activities before expenses, being sure not to double count any sources. If not itemized on Form 1065, special schedules should be attached providing this information.

[2] Identify and sum all interest expense (not interest income) incurred in all business activities, being sure not to double count. If not itemized on Form 1065, special schedules should be attached providing this information.

[3] Note that this is a short-cut method that, in some situations, may slightly understate total depreciation deducted.

[4] Note that this is a short-cut method that, in some situations, may slightly understate total depletion and amortization taken.

Exhibit C-3

DATA LOCATIONS ON SOLE PROPRIETORSHIP FORM

	Data Item	Location on Sole Proprietorship Form (Form 1040 Schedule C)
1.	Gross Receipts or Sales Less Returns and Allowances	1989-1990: I-3 1984-1988: I-1c
2.	Interest Expense	1990: sum of II-16a and II-16b 1986-1989: sum of II-17a and II-17b 1985: sum of II-19 and II-21 1984: II-17
3.	Depreciation	1989-1990: II-13 1984-1988: II-12
4.	Depletion	1989-1990: II-12 1984-1988: II-11
5.	Taxable Income Before NOL and Special Deductions	1990: II-29 1989: II-30 1987-1988: II-31 1986: II-32 1985: II-33 1984: II-32
6.	NOL Deductions	NA., use 0
7.	Special Deductions	NA., use 0
8.	Total Tax	NA., use 0
9.	Credit From Regulated Investment Companies	NA., use 0
10.	Credit For Federal Tax on Fuels	NA., use 0
11.	Cash	NA., use 0
12.	Trade Notes and Accounts Rec. Less Allowance for Bad Debts	NA., use 0
13.	Inventories	NA., use 0
14.	U.S. Government Obligations	NA., use 0
15.	Tax-Exempt Securities	NA., use 0

	Data Item	Location on Sole Proprietorship Form (Form 1040 Schedule C)
16.	Other Current Assets	NA., use 0
17.	Accounts Payable	NA., use 0
18.	Mortgages, Notes, Bonds Payable in Less Than One Year	NA., use 0
19.	Other Current Liabilities	NA., use 0
20.	Loans From Stockholders	NA., use 0
21.	Mortgages, Notes, Bonds Payable in One Year or More	NA., use 0
22.	Other Liabilities	NA., use 0
23.	Appropriated Retained Earnings	NA., use 0
24.	Unappropriated Retained Earnings	NA., use 0
25.	Total Liability and Stockholder's Equity	NA., use 0
26.	Income Recorded on Books not Included in Return	NA., use 0